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Surgical correction of open bite deformities by oblique sliding osteotomy

■ *Robert B. Shira,* D.D.S., Washington, D. C.*

The treatment of open bite deformities of the jaws is probably one of the most difficult problems encountered in dental practice. A standard textbook in orthodontics[1] states: "The treatment of malocclusion complicated by open bite is probably attended by the most unsatisfactory results that the specialty of orthodontia produces today. Even exceedingly skillful operators are baffled by the more extreme cases because of the great changes that have taken place in the bony supporting tissues of the teeth and the tenacity of the habit that has been instrumental in producing these structural modifications."

Since orthodontic treatment is frequently unsatisfactory in the management of this problem, surgical intervention often offers a logical solution. Surgical repositioning of the mandible to correct malrelations of the jaws has become a standard oral surgical procedure. Although many methods have been proposed for the management of this problem, most technics deal with the distal movement of the mandible, and little mention has been made of the open bite deformity.

Open bite deformities present a different and more complicated problem than routine prognathism. They occur most frequently in Class I and Class III jaw relationships and are seldom seen in Class II cases. Surgical correction in Class I cases requires repositioning of the mandibular teeth in a superior direction, whereas correction of Class III cases calls for movement in a superior and distal direction. Thus, although varying amounts of "setback" may be required, a "tipping" of the mandible with superior positioning of the anterior teeth is invariably necessary.

■ *Causes of Open Bite Deformities*

Open bite is a condition in which a space exists between the maxillary and mandibular anterior teeth when the posterior teeth are in contact. The open bite may extend back to include the bicuspids and first molars, with only the second

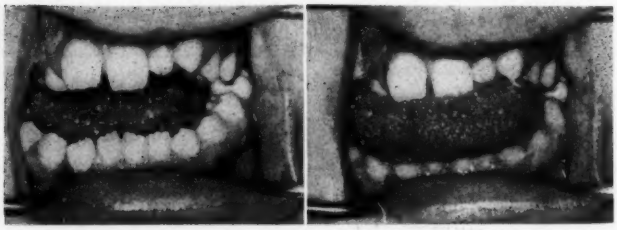

Fig. 1—Left: Typical open bite deformity with occlusal contact only in molar regions. Right: Open bite deformity produced by enlargement of tongue due to lymphangioma

molars in contact (Fig. 1, left). The malformation may be developmental or acquired.

Underdevelopment of the bones of the face or base of the skull may result in open bite.[2] This underdevelopment may take the form of underdevelopment of the premaxilla or a discrepancy in the vertical growth of the maxilla and mandible. The underdevelopment of the premaxilla may be idiopathic in origin or secondary to a disease process, such as rickets, that interferes with normal development of the skeleton.[3] The exact site of the discrepancy in vertical growth that contributes to this problem is not known, but the ascending rami of the mandible appear to be unduly short.[2] This arrested vertical development of the mandibular rami may result in a condition whereby only the last molars on each side are in contact, with the rest of the bite being open. Swinehart,[4] in a review of 115 cases of open bite, stated his belief that genetic and congenital factors played a very minor role as an etiological factor.

Acquired causes of open bite may be extrinsic or intrinsic factors. Extrinsic factors are almost always associated with some habit that prevents the normal eruption of the teeth. Use of pacifiers, or habits associated with blankets, toys, or finger-sucking and thumbsucking, have been known to produce the condition. A major extrinsic factor resulting in open bite is a malunion after inadequate management of fractures of the maxilla or mandible. Malunion of a displaced maxillary fracture in a posterior, inferior position may result in interceptive contact of the molars with a resultant space between the anterior teeth. Inadequate treatment of bilateral fractures of the mandibular condyle may result in a shortening of the ramus, causing an interceptive contact of the posterior molars. With this interceptive contact acting as a fulcrum, the shortening of the rami results in the maxillary and mandibular incisors being drawn apart.[3] Ineffective control of the fragments in bilateral fractures of the mandible occurring immediately anterior to the angle also may produce an open bite. With the elevator muscles tending to displace the proximal fragments superiorly and the depressor muscles tending to displace the distal fragment inferiorly, an open bite may occur unless firm, definitive immobilization of the fragments in the correct position is maintained.

The intrinsic factors contributing to an open bite are those associated with

abnormal use or action of the tongue, lips and cheek. These structures may be held between the teeth with such constancy that the normal eruption of the teeth is checked. When such a habit is persisted in for a number of years and the causative agent is of sufficient bulk to produce a separation of the occlusal surfaces of the molars by depressing the mandible, the molar teeth often will elongate, thus producing a condition of infraclusion of the incisors and supraclusion of the molars.[5]

Abnormal habits associated with swallowing and speech may be responsible for open bite. The so-called "tongue thrust," in which the tongue is thrust forward between the anterior teeth each time swallowing takes place, often exerts sufficient force to prevent normal eruption of the anterior teeth. Speech defects, particularly a lisping defect, occasionally will be accompanied by an open bite because of faulty tongue positions.

Tumors that produce enlargement of the tongue may contribute to the open bite problem. If the tumor is present before the eruption of the permanent teeth, it often will prevent complete eruption of the teeth with resultant open bite. If the tumor develops after normal eruption has taken place, it may assume sufficient proportions actually to depress the teeth. Hemangiomas, lymphangiomas and neurofibromas are the tumors most frequently involved in this problem (Fig. 1, right).

■ *Review of Surgical Procedures*

A review of the literature reveals that several surgical procedures have been proposed and utilized to correct open bite deformity. These fall into two general categories: those performed in the body

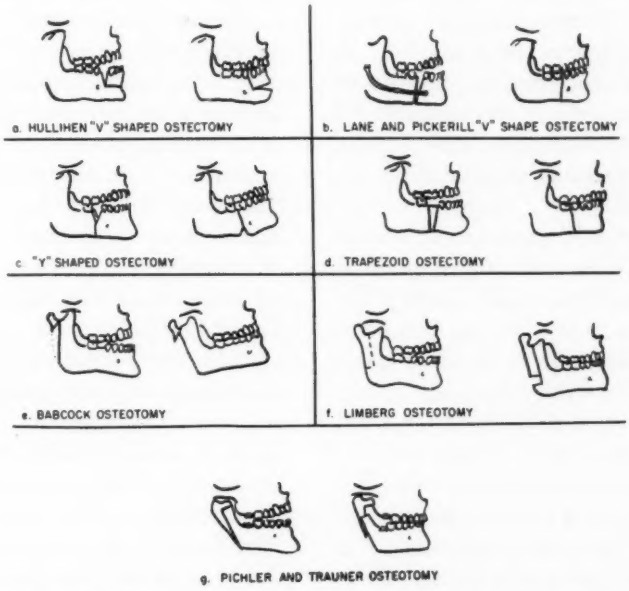
a. HULLIHEN "V" SHAPED OSTECTOMY
b. LANE AND PICKERILL "V" SHAPE OSTECTOMY
c. "Y" SHAPED OSTECTOMY
d. TRAPEZOID OSTECTOMY
e. BABCOCK OSTEOTOMY
f. LIMBERG OSTEOTOMY
g. PICHLER AND TRAUNER OSTEOTOMY

Fig. 2—Methods proposed for surgical correction of open bite deformities

or horizontal ramus of the mandible and those performed in the ascending ramus.

Hullihen's[6] famous operation, performed in 1849, consisted of the removal of V-shaped segments of bone from the body of the mandible in the bicuspid areas. The V-shaped excisions extended only two thirds of the way through the mandible, at which point the cut was extended forward in a horizontal plane (Fig. 2, a). This created a segment containing the anterior teeth which was then repositioned posteriorly and superiorly to the desired position. Similar procedures were carried out by Blair (as reported by Angle)[7] and Von Eiselberg.[8]

Lane,[9] and later Pickerill,[10] recommended a similar procedure but extended the V-shaped excision through the entire thickness of the mandible (Fig. 2, b). Blair[11] reported the use of a simple cut through the body of the mandible with repositioning of the anterior segment. Thoma demonstrated the removal of V-shaped,[12] Y-shaped[13] and trapezoid[12] sections from the body of the mandible for management of some of the varying problems encountered in this deformity (Fig. 2, b, c and d).

Ostectomy and osteotomy in the ascending ramus have been reported. Babcock[14] demonstrated various cuts in the ascending ramus to allow for repositioning of the anterior segment (Fig. 2, e). Limberg[15] utilized an oblique cut extending from the sigmoid notch to a point near the lower aspect of the posterior border of the ramus above the angle (Fig. 2, f). Here the cut extended distally on a horizontal plane to the posterior border, thus completely sectioning the mandible. Pichler and Trauner[16] recommended use of an inverted L bone cut, starting at the anterior border of the ascending ramus above the mandibular foramen. The cut was extended backward on a horizontal plane to a short distance in front of the posterior border. It was then extended downward on a vertical plane to the inferior border of the mandible. The proximal segment thereby consisted of that portion of the mandible above the mandibular foramen and the posterior part of the ascending ramus (Fig. 2, g). Caldwell[17] also recommended the Trauner type of bone incision for correction of these deformities.

Although excellent results have been obtained by the operations performed in the body of the mandible, certain inherent disadvantages are associated with the procedure. The anterior segment is usually small and difficult to control. With the persistence of any of the factors that originally produced the deformity, there is a tendency for remission, with the small anterior segment being forced back in an inferior direction. The bone contact in the corrected position is often minimal which is conducive to delayed union or nonunion. Rather prolonged immobilization is often necessary. Furthermore, although a good profile can be produced by performing the procedure in the body of the mandible, it does nothing to correct the obtuse angle that is so frequently a concomitant finding in this deformity.

Many of these disadvantages may be eliminated by performing the surgery in the ascending ramus. When surgery is carried out in this region, the anterior segment is large and easily controlled. Wide, accurate bone contact is possible, which is conducive to rapid healing. The

distal movement of the anterior segment produces a more acute mandibular angle with resultant improvement in facial appearance.

The uniform success obtained in the management of prognathism by a vertical, sliding osteotomy in the ascending rami, a procedure first described by Caldwell and Letterman[18] in 1954, prompted the utilization of this procedure, with major modifications, in a series of selected cases. Between August 1955 and August 1960, 78 patients with malrelationship of the jaws were treated at Walter Reed General Hospital, Washington, D. C. Eight cases of open bite were included in this series. The gratifying results obtained in these cases prompt this report.

■ *Preoperative Considerations*

Study models are obtained to determine if a satisfactory occlusal relationship is obtainable by repositioning the mandible. In most instances a satisfactory result is possible, for the defect seems to be more a malpositioning of the jaws than any major discrepancy in the size of the two arches.[19] If a satisfactory result can be anticipated, the amount of movement is determined. The models are mounted in the original position, and vertical pencil marks are made at convenient positions on the posterior teeth. The mandibular model is then moved to the corrected position, and the amount of movement in both the distal and vertical direction is measured. Minor discrepancies in occlusion are eliminated by selective grinding of the teeth, first on the study models and then in the patient's mouth.

As soon as possible before surgery, the patient is given corrective tongue exercises as suggested by Robinson.[19] These exercises consist of having the patient locate the papillae of the submaxillary ducts with the tip of the tongue. With the tip of the tongue turned down in this manner, the patient drinks a glass of water. This action forces the body of the tongue to thrust upward against the palate instead of between the teeth. The patient repeats this exercise several times a day. The exercises are carried through the period of immobilization and well into the postoperative period.

A complete preoperative workup, consisting of physical examination, roentgenograms, photographs, laboratory studies, blood typing and so forth, is carried out. Maxillary and mandibular labial arch bars are then positioned and wired securely to the teeth the day before surgery.

■ *Operative Procedure*

A 3 to 5 cm. incision is made through the skin and subcutaneous tissues beneath the angle of the mandible. By sharp and blunt dissection, the inferior and distal borders of the mandible are exposed. Care is taken to retract the facial nerve in the soft tissue flap. The periosteum is incised and elevated along with the overlying masseter muscle. Reflection of these structures exposes the lateral surface of the ascending ramus from the inferior border to the sigmoid notch. An oblique line is drawn with a dye marker from the sigmoid notch to a point just superior and distal to the angle. This line passes distal to the mandibular foramen. The mandible is then divided along this line with a Lindemann surgical bur in a straight handpiece, powered by a Jordan Day high-speed drill (Fig. 3, a).

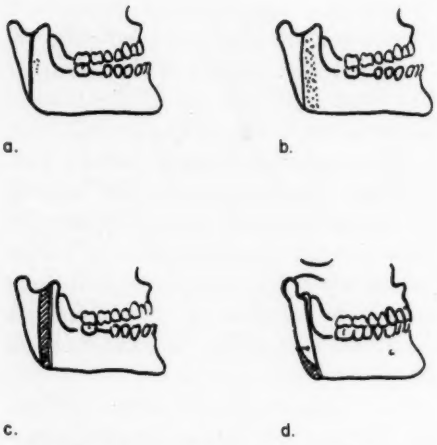

Fig. 3—Technic of oblique sliding osteotomy. a. Bone cut distal to mandibular foramen. b. Decortication of posterior portion of anterior fragment. c. Completed decortication. d. Repositioned mandible and fixation of fragments with interosseous wires

When the sectioning is complete, the posterior (proximal) fragment is freed of its muscular and ligamentous attachments until it is freely movable. Small drill penetrations are then made into the external cortex of the anterior (distal) fragment, anterior to the oblique cut. These penetrations are extended forward the same distance as the measured setback that has been determined from a study of the models (Fig. 3, b). The external section of the cortex is then removed with a chisel and mallet. This decortication does not carry completely through the external cortical plate, but merely freshens the bone and provides a mortised space for the reception of the proximal fragment when the repositioning of the mandible is complete (Fig. 3, c). The patient's head is then turned, and the procedure repeated on the opposite side.

After the bone has been sectioned on both sides, the drapes are turned down and the mouth entered. The mandible is moved manually to the desired position and immobilized by elastic traction between the previously applied maxillary and mandibular arch bars. The tipping or rotation of the tooth-bearing segment to bring the anterior teeth into the desired relationship results in the posterior part of this segment being moved in a distal and inferior direction. This places the segment in a favorable position to insure wide and intimate bone contact when the proximal fragments are ultimately placed in the desired position.

The surgeons then change gloves and gowns, redrape the patient, and reenter the extraoral wound on the right side. The proximal segment is placed on the lateral surface of the anterior segment in the decorticated region and held firmly in position while a drill hole is made at a strategic point through both segments. An .018-inch stainless steel wire is threaded through this hole and tightened firmly, holding the fragments in the desired position (Fig. 3, d). The procedure is repeated on the opposite side, and the wounds are then closed in layers. A firm pressure dressing, reinforced with Elastoplast bandage and adhesive tape, completes the procedure.

■ *Report of Cases*

Four cases are reported to describe some of the varying problems encountered in this deformity.

CASE 1—A 19 year old dependent son of an Army officer was referred for evaluation of a severe malrelationship of the jaws. Examination revealed an open

bite with contact on only the second molars. A space of 11 mm. existed between the incisal edges of the anterior teeth (Fig. 4, left). The patient had consulted several orthodontists who believed that the problem was uncorrectable by orthodontic means. A well-established tongue-thrust habit was evident, with the tongue being forced strongly between the anterior teeth with each swallowing motion.

Examination of the study models revealed that considerable improvement could be obtained by tipping the mandible and repositioning it in a superior position. No setback was necessary. Complete correction of the problem was not possible because of the supra-eruption of the posterior teeth; however, it was believed that sufficient improvement was possible to warrant the procedure and that orthodontic procedures could be carried out after surgery to improve further the relationship.

The patient was started on tongue exercises four weeks prior to surgery. On July 16, 1958, a bilateral, oblique osteotomy was carried out. Considerable difficulty was encountered in repositioning the anterior segment; however, it was possible to place the fragment in the desired position, where it was immobilized by intermaxillary elastic traction. The patient withstood the procedure well and made an uneventful recovery. He continued the tongue exercises during the period of immobilization and well into the postoperative observation period. The immobilizing appliances were removed at the end of five weeks, at which time there was evidence of firm bony union. Function was slowly restored with noticeable improvement in masticatory ability. Excellent occlusion was established in the bicuspid and molar regions, and although a slight space persisted between the anterior teeth on the left side, the patient was able to incise food for the first time in his life.

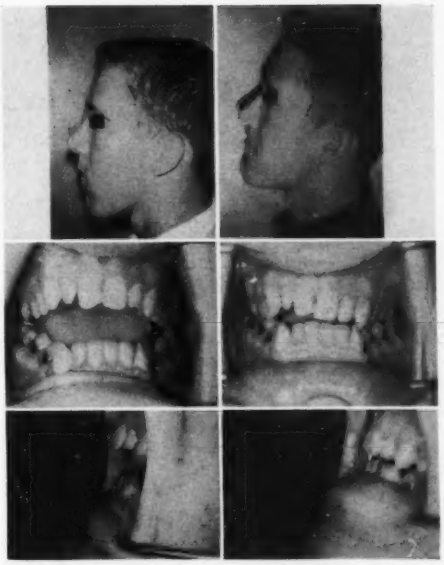

Fig. 4—Case 1. Left: Preoperative views of patient with pronounced open bite deformity. Right: Postoperative views 18 months after surgery

Orthodontic therapy was recommended to improve further the alignment of the anterior teeth. Both the patient and his parents were so happy with the results obtained from surgery, however, that they displayed no interest in additional therapy. Eighteen months after surgery there was no evidence of relapse (Fig. 4, right).

CASE 2—The importance of cooperation between the orthodontist and oral surgeon in correction of open bite is illustrated in Case 2. A 27 year old corporal was referred to Walter Reed General

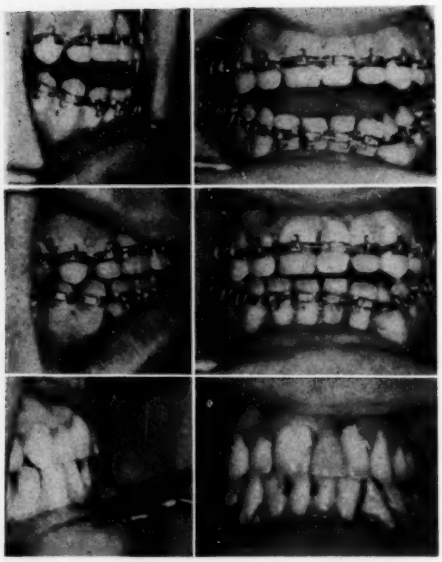

Fig. 5—Case 2. Above: Open bite deformity that persisted after orthodontic therapy. Center: Improvement in relationship of teeth obtained by surgical repositioning of mandible. Below: Added improvement in relationship of teeth by additional orthodontic therapy after surgical repositioning of mandible

Hospital on March 8, 1959, for evaluation of a malocclusion complicated by an open bite. He was currently under treatment by a civilian orthodontist, and appliances were on the maxillary and mandibular teeth. The orthodontist, in spite of vigorous treatment, had been able to obtain contact on only the last molar teeth. An 8 mm. opening existed between the incisal edges of the anterior teeth when the molars were in contact (Fig. 5, above).

Evaluation of the study models revealed that a good relationship of the anterior teeth was possible by tipping the mandible 9 mm. and setting it back 5 mm. The tipping of the mandible to obtain the desired relationship in the anterior region caused an opening of 3 mm. (Fig. 6) between the occlusal surfaces of the last molars on either side; however, it was believed that these teeth could be repositioned by the orthodontist after surgery, or could be built up with crowns.

The patient was immediately started on tongue exercises. On April 23, 1959, a bilateral, oblique, sliding osteotomy was carried out, repositioning the mandible into the previously determined position. The anterior fragment containing the teeth was immobilized by intermaxillary elastic fixation, utilizing the orthodontic appliances as anchors. The proximal fragments were mortised into the decorticated distal aspects of the anterior segment and securely immobilized with .018 inch stainless steel wire.

The patient made an uneventful recovery. The intermaxillary fixation was removed in five weeks, at which time firm union of the fragments had taken place. The relationship of the anterior teeth was considerably improved; however, the orthodontic appliances were left in place to be utilized for further orthodontic therapy (Fig. 5, center). The space that had existed between the occlusal surfaces of the last molars was now closed. It was evident that the elastic traction used in immobilization had acted as an orthodontic appliance and corrected the occlusion of these teeth.

The patient was referred back to his orthodontist for further modifications of the anterior teeth. He was last seen in August 1960, at which time orthodontic treatment had been completed (Fig. 5, below). The result, both esthetically and functionally, was most satisfactory.

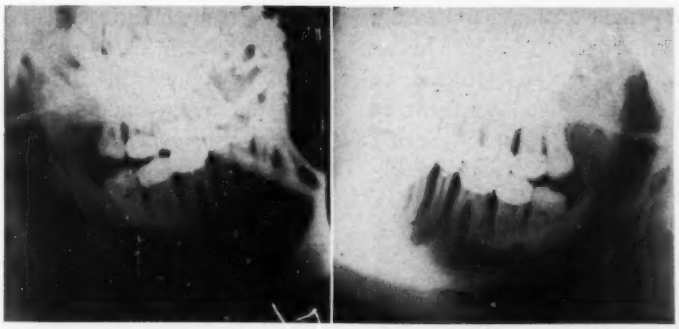

Fig. 6—Case 2. Right and left lateral views after surgical repositioning of teeth. Note position of fragments with wide, intimate bone contact. Tipping the mandible created a space between occlusal surfaces of molars

CASE 3—Some open bite deformities are complicated by a lateral positioning of the mandible. Correction requires movement of the mandible in a lateral direction, in addition to any tipping and distal movement that may be indicated.

A 24 year old Negro soldier was referred to Walter Reed General Hospital March 7, 1960, for consideration of surgical correction of a severe malocclusion associated with a prognathism and open bite. Examination revealed that occlusal contact was present on only the last molar teeth, with a 7 mm. space existing between the incisal edges of the anterior teeth. In addition, the mandibular teeth were 7 mm. in a protrusive position and 6 mm. to the right of the midline (Fig. 7, above). A well-established tongue-thrust habit was evident.

The patient was extremely self-conscious about his deformity and appeared to be rather shy and retiring. He was an intelligent individual who felt that if this deformity were corrected he could assume his position in society in a more capable manner.

Study models were obtained. By selective altering of the occlusal surfaces of the molars, it was found that a most satisfactory correction could be obtained by tipping the anterior region superiorly 7 mm., and moving the mandible back 7 mm. on the right and 16 mm. on the left. The larger setback on the left side was necessary to correct the deviation of the mandible to the right.

The patient was accepted for surgery. He was immediately started on exercises to correct the tongue habit, and arch bars were constructed and securely wired to the teeth. The occlusal surfaces of the molars were ground in the same manner in which the study models had been corrected. On March 10, 1960, a bilateral, oblique, sliding osteotomy was performed, and repositioning of the mandible into the predetermined position was accomplished with ease. The preoperative grinding of the teeth permitted the re-establishment of excellent occlusal contact throughout the arch.

The mandible was immobilized for five weeks. When the intermaxillary fixation was removed, firm bone union was evident. Exercise rapidly restored func-

tion, and the patient was discharged from the hospital on April 28, 1960. The repositioning of the mandible corrected the facial asymmetry and gave the patient an efficient masticatory apparatus for the first time in his life (Fig. 7, below). In addition, continued observation revealed a marked change in the patient's personality. The operation had changed him from the unusual to the usual, which had a profound effect on his outlook on life and his ability to cope with his surroundings.

CASE 4—The versatility of this procedure is illustrated in Case 4. The patient, a 43 year old noncommissioned officer, was transferred to Walter Reed General Hospital on October 1, 1959, for evaluation of a severe deformity of the mandible. The history revealed that he had sustained multiple fractures of the facial bones in a transportation accident while stationed in England in 1944. Among the injuries were bilateral fractures of his edentulous mandible. These fractures were located just anterior to the angle on either side. Open reductions had been carried out, with interosseous wires being utilized to reduce and immobilize the fragments. Apparently no additional means of fixation had been provided, for the fractures healed with severe displacement of the fragments. The proximal fragments on each side had been displaced superiorly and the distal fragment had been displaced in an inferior direction. This created the problem of limited intermaxillary space between the alveolar ridges posteriorly and an open bite and protrusion anteriorly (Fig. 8, left).

Several attempts to construct den-

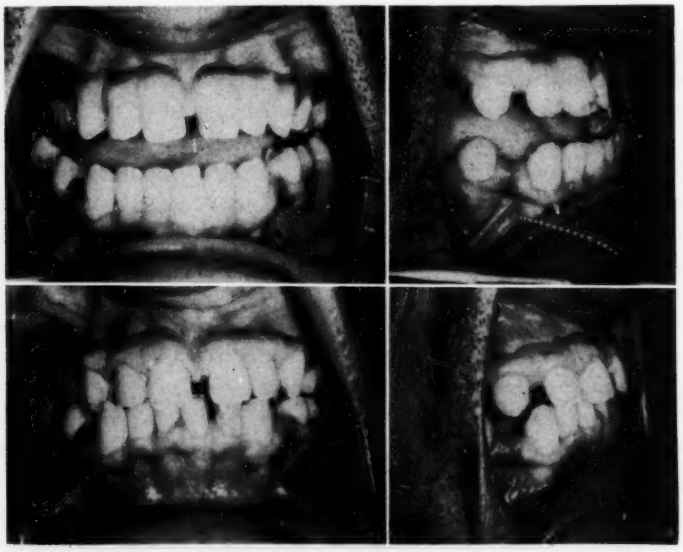

Fig. 7—Case 3. Above: Open bite deformity with slight prognathism and lateral positioning of mandible. Below: Improvement in relationship of teeth from surgical repositioning of mandible

tures had ended in failure. Since there was insufficient intermaxillary space to accommodate conventional dentures, a prosthodontist had constructed a rather ingenious maxillary denture that replaced the anterior teeth and furnished hollow grooves in the acrylic resin in the posterior region, into which the edentulous mandibular ridge fitted on closure. The patient had not worn a mandibular denture since his injury in 1944. An altered profile, characterized by an obtuse mandibular angle and noticeable prominence of the chin, resulted from these malunited fractures (Fig. 8, left).

Roentgenograms revealed a very thin, atrophic mandible with evidence of well-healed fractures just anterior to the angle on both sides. The proximal fragments were displaced superiorly and the distal fragment was in an inferior position, producing a "reverse curve" to the body of the mandible (Fig. 9). The interosseous wires had been removed sometime prior to the patient's admission to Walter Reed General Hospital. An impacted bicuspid tooth on the left side was an incidental finding.

Surgical correction of the deformity was obviously necessary if the patient was ever to wear satisfactory dentures and if the facial appearance was to be improved. Consideration was given to recreating the original fractures to allow repositioning of the fragments in the correct position. This plan, however, was abandoned, because of the small size of the atrophic mandible and the difficulty that could be anticipated in repositioning and maintaining the badly displaced fragments. An oblique, sliding osteotomy in the ascending rami of the mandible was then selected as the method of choice. It was felt that this approach would allow the necessary tipping of the mandible and still afford the control of the fragments that was needed to insure healing in the corrected position.

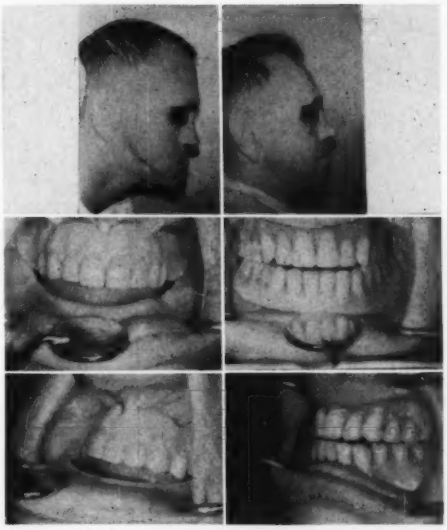

Fig. 8—Case 4. Left: Open bite deformity after inadequate reduction of mandibular fractures. Note absence of a prominent angle, loss of intermaxillary space, and forward positioning of mandible. Right: Postoperative results. Note improvement in facial contour and re-establishment of normal intermaxillary relationship

Study models were constructed and mounted on an articulator in the correct vertical relationship. The mandibular cast was then removed and repositioned to create a normal intermaxillary space and the correct parallelism of the ridges. This required a tipping of the cast 10 mm. and a setback of 7 mm. It was obvious that as the cast was tipped upward in front, it was lowered in back, thus obtaining the desired result (Fig. 10). Interlocking maxillary and mandibular splints were

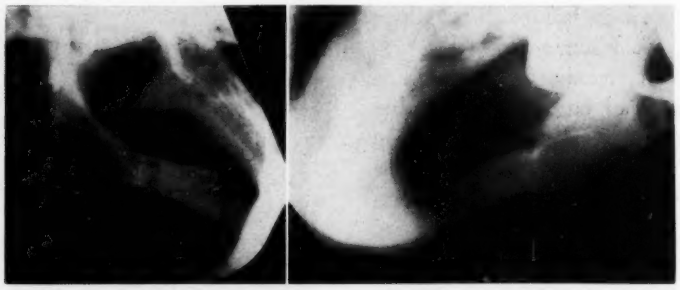

Fig. 9–Case 4. Preoperative views. Note superior displacement of rami, obtuse angle of mandible and inferior displacement of body of mandible. This combination of factors produced a reverse curve of mandible

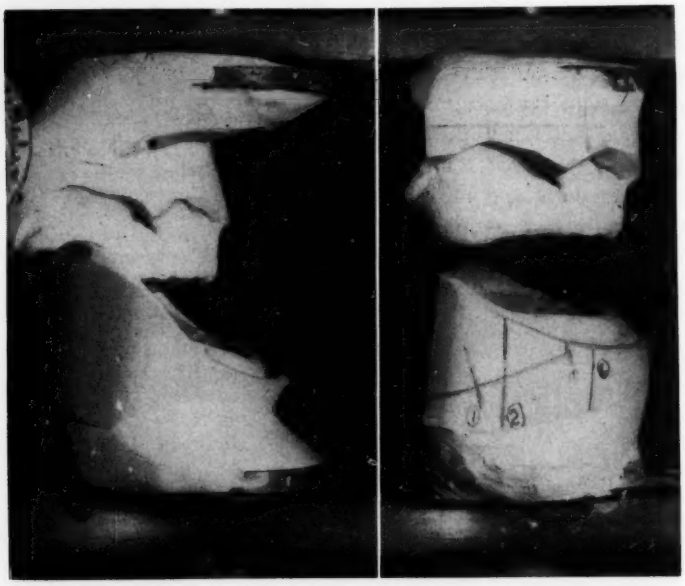

Fig. 10–Case 4. Left: Casts mounted in preoperative position. Right: Mandibular cast removed and repositioned in desired position. Note tipping that was necessary to establish normal intermaxillary relationship

then constructed, with the casts mounted in the corrected position. The day before surgery these splints were securely fastened to the maxilla and mandible. The maxillary splint was secured by four wires from the malar bones and the pyriform fossa and the mandibular splint by three circumferential wires.

On October 25, 1959, a bilateral, oblique, sliding osteotomy was performed. After sectioning the mandible on both sides, the anterior segment was reposi-

tioned until the splints came into the interlocking, predetermined position. They were securely locked by intermaxillary wires extending from hooks that had been incorporated in the splints. The tipping of the mandible, combined with the 7 mm. setback, moved the anterior fragment in a posterior direction a sufficient distance so that wide bone approximation was secured when the two proximal segments were mortised into its decorticated portions (Fig. 11 and 12).

The small size of the atrophic mandible prompted the retention of the immobilization appliances for a longer period than was normally utilized. They were removed at the end of seven weeks. Although there was considerable restriction of vertical opening, firm bony union had taken place. Mouth exercises and physical therapy measures were instituted and normal function gradually returned. New maxillary and mandibular dentures were inserted on January 15, 1960. The patient, obviously happy to have a masticating surface after so many years, rapidly became adjusted to the dentures and was eating a normal diet by February 1. The patient, the oral surgeons and the prosthodontists were all pleased with the improvement in function and appearance (Fig. 8, right).

Fig. 11—Case 4. Bilateral oblique sliding osteotomy completed and fragments immobilized. Note attachment of maxillary splint by wiring to malar bones and pyriform fossa, and mandibular splint by circum-mandibular wiring. Bone fragments are held in position by interosseous wires

■ *Discussion*

The objective of surgical repositioning of the mandible in open bite deformities is to obtain the best possible functional and cosmetic results. Although several surgical procedures have been proposed for this problem, the sliding osteotomy performed in the ascending ramus of the mandible appears to have several advantages. It is an open operation, permitting direct vision of the operative field at all times. Accurate control of the fragments is possible, and wide, intimate contact of the fragments after repositioning of the mandible is assured. Because of the accurate approximation of the fragments, bony consolidation is rapid, minimizing the period of immobilization. Finally, the contour of the angle of the mandible is improved, thereby adding measurably to a more pleasing facial appearance.

Although oblique, sliding osteotomy has proved very adaptable in management of open bite deformities, it is obvious that it cannot be utilized in all instances. It is indicated where the correction calls for

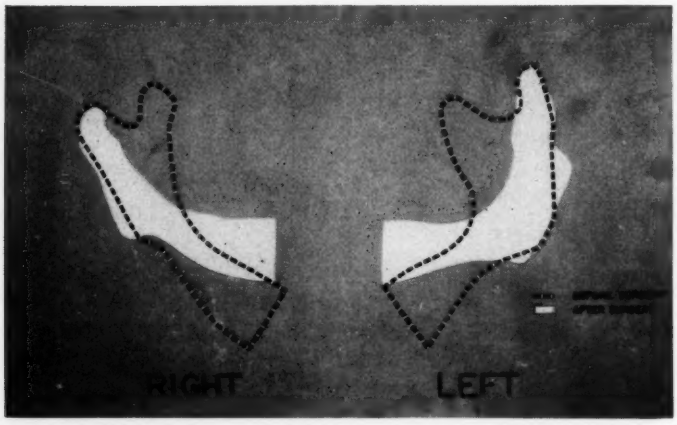

Fig. 12–Case 4. Overlay tracings of preoperative and postoperative roentgenograms showing amount of movement that was accomplished

a tipping of the entire horizontal ramus of the mandible. If, however, the open bite deformity is limited to the anterior teeth, with the bicuspids and molars in good relationship, one of the surgical procedures in the body of the mandible would be preferable.

In management of open bite, surgery succeeds where orthodontics sometimes fails because the surgeon moves the base (bone) along with the teeth. The orthodontist is certainly capable of moving the teeth, but in correction of some instances of open bite, sufficient movement to obtain the desired results would literally move the teeth out of their bony support. Thus, the logical answer seems to be to move the bone with the teeth. Cooperation with the orthodontist in the preoperative and postsurgical periods is certainly indicated in order to insure optimum results (Fig. 5).

Movement of the bone with the teeth also seems to exert a favorable influence in breaking any intrinsic causative habits that may be present. By completing the repositioning in one stage and holding the fragments in the corrected position until firm bony union occurs, there appears to be little tendency for remission. By eliminating the space where tongue and lips were habitually placed in creating the deformity, the habit is usually brought under control. Tongue and swallowing exercises also exert a favorable influence in correcting these habits.

The direction of the bone cut is the major difference between the oblique osteotomy and the vertical osteotomy. In the vertical osteotomy, the cut starts at the sigmoid notch and descends over the mandibular foramen to a point anterior to the angle. In the oblique osteotomy, the cut starts at the sigmoid notch and descends distal to the mandibular foramen to a point posterior and superior to the angle. I have utilized both cuts and have found no difference in the final results. Hence the oblique cut, which eliminates the danger of injury to the structures en-

tering the mandibular foramen, seems to be preferable.

I believe that decortication of the posterior part of the anterior fragment is indicated. A superficial decortication that provides a freshened, mortised surface to receive the proximal fragment insures rapid healing and can be accomplished without measurably increasing the operating time. This decortication does not carry completely through the lateral cortical plate.

At Walter Reed General Hospital, interosseous wiring has been used consistently to maintain the fragments in the desired position. Positive control of fragments is a basic principle of fracture treatment, and it is logical to assume that wiring of the fragments is a more positive means of insuring control of the fragments than depending on muscular pull to perform this function. There have been no adverse experiences with wiring the fragments in any instances of prognathism at the Hospital.

In earlier cases the coronoid process was detached from the ramus and allowed to remain free in the wound. In later cases the coronoid process was not detached and no difference has been seen in the final results. Hence, the only time the coronoid process is detached is when difficulty is anticipated in repositioning the mandible.

■ *Summary*

The causes of open bite deformities have been discussed and the procedures proposed for the surgical management of this problem have been reviewed. A method of correcting selected open bite deformities by an oblique, sliding osteotomy in the ascending rami has been presented. The advantages of performing the operation in the ascending ramus may be listed as follows:

1. It is an open operation, allowing direct vision of the operative field at all times.
2. Positive control of the fragments is possible.
3. Wide, accurate bony contact of the fragments is assured.
4. Bone consolidation is rapid.
5. The period of immobilization is short.
6. The wide contact of the fragments, leading to rapid bone union, minimizes any tendency for the deformity to recur.
7. Improvement of contour of the mandibular angle improves cosmetic appearance.

The versatility of this procedure and the uniformly good results that have accompanied its use indicate that the method should be given serious consideration when open bite problems are encountered.

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Histochemistry of oral cancer

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The histochemistry of oral cancer should not be considered as a separate entity but rather as the histochemistry of cancer in general. In both oral and general histopathology, pathologists are frequently confronted with diagnostic problems relating to the inability of routine stains to give more information as to the pathogenesis and prognosis of a lesion. Very recent advances in histochemistry appear to have brought the day closer at which time highly specific staining technics will be used not only in the diagnosis of atypical tumors, but also in the detection of malignancies in mass-screening procedures.

Although the term histochemistry connotes to some a rather new and radical departure from older biological traditions, the field is actually as old as histology itself. Even though the first histologists used various vegetable and synthetic stains to color tissue sections, it gradually became known that certain chemical agents in stains would combine with tissue components in an actual chemical reaction, and could be seen as such. One of the earliest discoveries of a so-called histochemical reaction was made in 1826 when iodine was used to identify starch granules under the microscope because it colored the starch granules blue. During this period microincineration was also developed and the technic of cutting frozen sections was discovered. The use of aniline dyes also became widespread, and this plus other developments caused a rapid expansion of descriptive histology and histopathology. Histologists and pathologists were primarily interested in new dyes and staining technics and showed little interest in the chemistry of tissue structures. Although the diagnostic significance attached to many of these new color reactions with aniline and other dyes served as the basis of modern pathology, no attempt was made to really put staining mechanisms on a known physical or chemical basis. In 1936 Lison[1] published the first book on histochem-

istry. Even at that late date histochemical staining methods were rather few and far between. However, Lison's book marked the beginning of modern histochemistry. He definitely states the premises of the discipline of histochemistry whereby various chemical constituents of tissue can be visualized through the microscope. In 1950 the American Histochemical Society came into being and in 1953 a new journal, *The Journal of Histochemistry and Cytochemistry,* commenced publication. Extremely rapid progress has been made during the last ten years so that today a whole series of methods are available which can be applied to microscopic sections and which will demonstrate various tissue constituents such as enzymes, nucleic acids, carbohydrates and proteins.[2] One of the new aspects is the development of methods which will enable the afore-mentioned components to be visualized not only through the light microscope but through the electron microscope.

The application of histochemistry to the study of oral cancer represents a fairly straightforward concept. Both theoretical factors as well as experimental evidence suggest that the biochemical makeup of cancer tissue is different from that of normal tissue.[3] Therefore, the determination of the precise biochemical changes which occur in cancer should be of value not only for a basic understanding of the neoplastic process but also from a standpoint of early diagnosis. At this point the difference between biochemical and histochemical analysis of a tissue (for example, tumor) should be clarified. In general, biochemical analysis gives, for example, the total enzyme activity of an entire sample of tissue but is not able to distinguish between different individual cellular components of that tissue. The advantage of biochemical methods lies in their accuracy of quantitation in the usual numerical sense. The great advantage of histochemical technics lies in the fact that they are able to localize chemical activity at the histological and even cytological level. Thus, characteristic enzyme activity may be detected in one or two cancer cells in a tissue section which is composed of hundreds of cells.

At the recent First International Congress of Histochemistry held in Paris, France, considerable emphasis was placed upon the application of histochemical technics in the study of cancer.[4]

■ *Principles and Technics*

Brief mention should be made of some of the basic principles and technics employed in histochemistry. Tissues routinely fixed in Zenker's fluid or formaldehyde at room temperature are not satisfactory for histochemical purposes. This is because of the fact that proteins, including enzymes, are denatured and inactivated by such procedures. Special fixation technics have thus been evolved.[5,6] Of these, one of the more sophisticated is the freeze-dry procedure. This technic was first devised by Altmann in Germany in 1889, and later was improved upon by Gersh in this country. (Freeze-drying is the method by which human plasma powder is prepared.) Small pieces of tissue are rapidly frozen in liquid nitrogen and dehydrated in a vacuum chamber. The dried tissue is subsequently embedded in paraffin blocks from which routine sec-

tions may be cut. The advantage of this technic is that the deleterious effects of chemical fixation and dehydration are avoided. However, with some very delicate enzyme systems such as cytochrome oxidase, paraffin embedding, plus the removal of the paraffin by organic solvents, completely inactivates the tissue. In special cases such as this, unfixed frozen sections are used.

The histochemical technics for enzymes as well as other tissue components are particularly interesting in that they employ highly specific chemical reactions which result in the formation of a dye or insoluble precipitate in the tissue section. In some instances a colorless product is formed which must be transformed by subsequent steps into a visible compound. With enzyme technics, a tissue section is incubated with a substrate which is known to be hydrolyzed by the enzyme being studied. The substrate solution also contains another chemical substance which will trap the products of hydrolysis and form an insoluble deposit. In many instances the presence of an additional reagent to trap the product of hydrolysis will, in itself, tend to affect the enzyme reactions and may lead to certain artifacts. Recently newer technics have been developed which eliminate the presence of this additional reagent.[7,8] Enzyme activity has also been revealed by ultraviolet fluorescence.[7,8] The latter technics are interesting because of their high sensitivity. To date, histochemical studies of cancer have utilized primarily the technic of enzyme histochemistry. The following represent some of the enzyme systems that have been studied in the neoplastic state.

ALKALINE PHOSPHATASE — Alkaline phosphatase is an enzyme which occurs in a great many normal tissues. High activity is seen in calcifying bone and cartilage, developing teeth, intestinal epithelium, and capillary endothelium. Osteogenic tumors, such as osteogenic sarcomas, usually exhibit high alkaline phosphatase activity and this characteristic may offer a diagnostic clue in poorly differentiated tumors of osteogenic origin. Tumors of odontogenic origin also probably show high alkaline phosphatase activity although there have been no specific reports on this subject.

ACID PHOSPHATASE — Acid phosphatase, as its name implies, is an enzyme which hydrolyzes phosphoric acid esters at an acid pH. This enzyme is less widely distributed in the body than its alkaline counterpart. Normal prostatic epithelium and osteoclasts associated with active bone resorption show very high enzyme activity. Macrophages and foreign body giant cells are also reactive. Giant cells in fibrous dysplasias as well as in osteogenic sarcomas also are reactive.[9,10] Dyskeratotic cells in human epidermoid carcinomas are revealed by the acid phosphatase method.[10] No detailed study of the diagnostic implications of this observation have been made, however.

PHOSPHAMIDASE — Phosphamidase is an enzyme which is known to hydrolyze the phosphorus-nitrogen bond. The original method and primary investigation of the distribution of this enzyme in tissues was made by Gomori.[5] Unfortunately, as he points out, the histochemical method is somewhat erratic. He made the very

interesting discovery that over 90 per cent of all malignant epithelial tumors show very high activity. Sarcomas are primarily inactive. The diagnostic use of the phosphamidase method is of limited value because the intensity of the staining reaction usually corresponds with the neoplastic change as seen with hematoxylin and eosin.

ESTERASE—The term esterase, when used in histochemistry, indicates a group of closely related enzymes which hydrolyze simple fatty acid esters such as acetates and butyrates. Esterases which are widely distributed throughout the body can be demonstrated by a number of histochemical technics. With regard to visceral tumors it has been shown that metastases of liver and pancreatic tumors show characteristic esterase activity even though these metastases may be poorly differentiated.[11] Bronchogenic carcinomas as well as certain intraoral epidermoid carcinomas exhibit groups of active cells scattered throughout an essentially inactive tumor. There do not appear to be any clear-cut morphological differences between the active and inactive cells. In some sites dyskeratotic cells show considerable activity. The latter finding is similar to that observed with the acid phosphatase method. Salivary gland ducts in man and in other species are highly active.[12] However, no systematic study of esterase activity in salivary gland tumors has been made.

AMINOPEPTIDASE — This enzyme hydrolyzes terminal peptide bonds and can be demonstrated through the use of several newly synthesized substrates. The function of aminopeptidase is not clear from the biochemical standpoint. However, its presence, as revealed by histochemical methods, in macrophages and also adjacent to sites of tissue breakdown certainly suggests that this enzyme is implicated in proteolysis.

There are only a few published studies relating to the mechanism by which tumors invade and spread in tissues. Some of the older German work suggests that neoplasms may spread because they produce proteolytic enzyme which acts upon the adjacent connective tissue stroma. This appeared to be confirmed by earlier studies[13] on tumor homogenates which showed an increase in proteolytic enzymes. Some, however, felt that this increase was due to the presence of polymorphonuclear leukocytes. The problem of the distribution of proteolytic enzymes in cancers has only begun to be clarified with the recent advent of histochemical technics for the demonstration of aminopeptidase. In 1956 the first histochemical demonstration of a proteolytic enzyme in human cancer tissue was reported.[14] It was found that in epithelial tumors such as intraoral epidermoid carcinomas, aminopeptidase activity was primarily confined to the connective tissue stroma adjacent to rapidly growing tumors. Subsequently, Braun-Falco[15-17] in Germany confirmed these findings and suggested a possible relationship between peptidase and invasiveness of certain tumors. This author indicates that although leukocytes show considerable aminopeptidase activity, the increased proteolytic activity of the connective tissue bordering tumors may signify much more than an inflammatory response. In 1957 Sylvén and

Malmgren[18] in Sweden published an extensive monograph on peptidase in tumors, describing the use of microbiochemical procedures. They suggest a relationship between invasiveness and proteolytic enzymes. These authors state that the present basis of the problem of the destructiveness of tumors appears to be the microscopic observation which suggests some kind of extracellular proteolysis of proteins adjacent to malignant tumors. The more recent histochemical study of Glenner and co-workers[19] discusses in some detail peptidase activity of various types of connective tissues. Of interest is a comment in the recent textbook of pathology edited by Florey.[20] "The only possible mechanism left (for the invasive ability of malignant tumors) is that malignant tumor cells elaborate some kind of extracellular lytic products capable of dissolving or partially destroying the tissue being invaded." It should be pointed out, however, that the peptidase activity of cancers is not always localized to the stroma. Melanomas, for example, show activity in the tumor cells per se.[19] Last year, several Dutch pathologists[21] reported that the histochemical peptidase technic was of value in detecting human gastric carcinoma metastases in lymph node biopsies since these cells also show considerable activity. Wattenberg[22] of the University of Minnesota used the same technic in a study of gastric carcinoma, and concluded that changes in aminopeptidase activity may be related to the neoplastic process.

Even though the final goal is the application of peptidase or similar technics in the diagnosis of human cancer, the value of these methods in the study of experimental tumor pathology should not be overlooked. From this standpoint, a number of studies have been made in order to investigate whether proteolytic enzymes (possibly liberated from tumor cells) are implicated in the observed extracellular proteolysis of fibrous host proteins at the periphery of malignant tumors.[18,23,24] Unfortunately, researchers are limited by the fact that there is at present only one histochemical technic for the demonstration of peptidase.

CYTOCHROME OXIDASE—Cytochrome oxidase, a major respiratory enzyme, is widely distributed throughout the body. Tissue with high metabolic activity (for example, brain, skeletal and cardiac muscle) is known to exhibit high oxidase activity. In 1885, Ehrlich found that if alpha-naphthol and N,N-dimethyl-p-phenylenediamine were injected into living tissue a blue dye was formed in vivo. Years later Keilin and Hartree found that the formation of a dye was due to the presence of cytochrome oxidase. A review of the older literature on this subject is contained in the text of Gomori.[5]

Today accurate methods are available for the histochemical demonstration of cytochrome oxidase.[25] Although biochemical studies indicate that changes in oxidase activity accompany the neoplastic process, there have been no definitive studies of cytochrome oxidase in oral neoplasms.

■ *Comment*

To those not closely associated with the field, it might seem that a logical approach at the present time would be to apply some of the afore-mentioned tech-

nics in a large-scale study of oral cancers. Although such a view is undoubtedly correct from a superficial standpoint, it does not take into consideration the relatively limited number of technics at our disposal. Thus, a dual attack should be made on the problem of diagnosis of oral cancer by means of special staining procedures. In addition to the application of known technics, very strong emphasis should be placed on the development of new methods and procedures. New histochemical technics which are characterized by the development of sophisticated organic chemical substrates offer manifold possibilities for the diagnosis of oral and systemic neoplastic disease.

Presented in the panel discussion, "Stimulated tumors in oral tissues," American Dental Association, one hundred and first annual session, Los Angeles, October 18, 1960.

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■ Wisdom

A wise man will desire no more than what he may get justly, use soberly, distribute cheerfully and leave contentedly.—*Benjamin Franklin.*

Angiofibroma of cheek and infratemporal fossae

■ *William B. Irby,* D.D.S., M.S., U. S. Army*

The tumor which will be discussed in this article is common to the nasopharynx, and it is justly conceded to fall within the realm of the otorhinolaryngologist. When described in the literature it is generally referred to as a nasopharyngeal fibroma, nasopharyngeal angiofibroma or a juvenile fibroma. Although little reference to this neoplasm appears in the dental literature, there are several reasons which appear to merit a discussion of this tumor, since knowledge regarding it is important to the general practitioner of dentistry or to the specialist in the field of oral surgery.

These reasons are:

1. Members of the dental profession should be familiar with pathologic abnormalities of the nose, paranasal sinuses and pharynx.

2. This lesion should be considered in the differential diagnosis of tumors which tend to involve the cheek, palate, nose and sinuses.

3. It is generally agreed by persons who have described this tumor that it originates and develops within the inner side of the nasopharynx medial to the superior constrictor muscle. The case which will be reported herein concerns an angiofibroma which might conceivably have arisen from the tissue medial to this muscle, but it presented no evidence of growth in this location, the principal region of involvement being the cheek and infratemporal fossae.

■ *Characteristics of Neoplasm*

The angiofibroma or juvenile fibroma of the nasopharynx is considered to be a disease of adolescence and is confined almost entirely to males. There is a decided tendency for this neoplasm to regress in adult life. The tumor occurs infrequently as manifested by the fact that, of some 2,000 head and neck tumors seen at New York Memorial Hospital yearly, two per year are juvenile fibromas.[1]

Clinically, this tumor usually appears as a lobulated pink or bluish-red mass. The color seems to be dependent on the age of the tumor and the degree of connective tissue proliferation which occurs with the aging process. Growth is very rapid and persistent in some cases, whereas in others it is a slowly enlarging process. In its growth this tumor may extend in a number of directions producing an erosion of the walls and an invasion into the maxillary, ethmoid, and sphenoid sinuses. Occasionally, the floor and medial wall of the orbit may become eroded with

an invasion of tumor into the orbital cavity and a resultant exophthalmus. Destruction of the hard palate may occur from extension of the tumor into the nasal cavity with a resultant filling of the palatal vault. Involvement of the soft tissues of the cheek is generally thought to be caused by destruction of the lateral wall of the maxillary sinus and growth of the neoplasm into the cheek tissues.

In addition to tissue destruction produced by the expansion of this neoplasm, the hazards of hemorrhage and respiratory embarrassment must be considered. Occasionally the tumor may attain such proportions that a large portion of the nasopharynx and nasal passages is occluded, making respiratory exchange very difficult. As these tumors are extremely vascular, the danger of spontaneous hemorrhage or excessive bleeding at the time of surgery must be seriously considered.

Malignant transformation has been reported to take place in this tumor. This alteration, however, is an extremely rare occurrence, and this cellular change might well have been influenced by the use of radium in the treatment of the neoplasm.

Histologically, these neoplasms are composed of connective tissue liberally infiltrated with a combination of normally appearing blood vessels and blood spaces lined with a single layer of endothelial cells. As the neoplasm grows, connective tissue proliferation continues at the expense of the blood spaces[2] and the tumor becomes less vascular.

■ *Theories of Etiology*

The tissue origin of this tumor, still in doubt, has been debated for three quarters of a century. Actually, the etiology of this neoplasm remains unknown. In 1954, Dane[3] published a review of the three theories most worthy of mention. They are:

1. The tumor develops from the perichondrium of the embryonic occipital plate which forms the basal portion of the occipital bone, body of the sphenoid, medial plate of the pterygoid process and bone around the foramen lacerum. The basilar portion of the occipital bone is connected with the body of the sphenoid by fibrous cartilage until a person reaches approximately the age of 25, after which it becomes calcified. Anatomically, this region lies above the roof of the nasopharynx. Objections voiced to this theory are: (a) it does not explain the sexual selectivity; (b) the angiomatous elements of the tumor are not accounted for; (c) the tumor does not contain cartilage or bone as a component part which should be expected if it were a product of the perichondrium.

2. The second theory was proposed by Brunner.[4] He believes that this tumor arises from connective tissue which covers the posterior wall of the nasopharynx and roof of the epipharynx, and which he terms "fascia basalis." In a lengthy description of the anatomy of the pharynx, he points out that the walls of the nasopharynx consist of a strong, fibrous membrane termed "pharyngeal aponeurosis" which is lined internally by mucous membrane and outwardly is covered by the constrictor muscles. These muscles, in turn, are covered externally by a thin layer of fascia, which at its superior part passes forward on the surface of the buccinator muscle and is called "buccopharyn-

geal fascia." The pharyngeal aponeurosis and the buccopharyngeal fascia blend together close to the base of the skull where the superior constrictor muscle is absent on each side. This region is termed the "sinus of Morgagni." The sheath formed by the blending of these layers of fascia forms a very thick layer of connective tissue termed the "fascia basalis." Superiorly, this fascia blends with the periosteum of the base of the skull. Histologically, the "fascia basalis" may be separated from the periosteum. It contains many blood vessels, especially in the region of the midline, leading one to believe that a vascular type tumor might easily arise from this region.

Again, it is difficult to explain sexual selectivity, if this theory of etiology is accepted.

3. A third theory has been propounded which attempts to explain: (a) the angiomatous character of the tumor; (b) the sex relationship, and (c) the regression of the neoplasm with sexual maturity.

It is emphasized that the region in which this tumor develops is richly vascular, and it is not surprising that neoplastic proliferations are angiomatous in character. The fact that this tumor occurs almost exclusively in males is explained on the basis that it is sex-bound. Dane[3] believes that the tumor is not sex-bound but androgen-bound, which would explain why it is occasionally seen in females. He points out the well-known fact that some small amount of the opposite sex hormone is produced by individuals of both sexes. The level of androgens in females during puberty fluctuates greatly, and an imbalance between androgenic and estrogenic hormones may exist for a sufficient period of time to initiate the development of the neoplasm in the female. He further explains the spontaneous regression of the tumor, which often begins when a person is around the age of 20 to 25, on the basis of cessation of sexual development with maturity.

■ *Treatment*

In the event that the rate of growth or size of this neoplasm necessitates therapy, three approaches may be chosen; namely, the employment of (1) surgery, (2) irradiation, or (3) sclerosing agents. A brief description of each method follows.

The relative inaccessibility to the nasopharynx and the extreme hemorrhagic tendencies of this neoplasm make surgery a difficult and hazardous procedure. The tumor may be approached by several routes but, regardless of the technic selected, the exposure is inadequate and hemorrhage is very difficult to control. Because of its hemorrhagic character, this is one lesion in which the rather routine procedure of taking a biopsy should be deviated from, unless there is sufficient doubt as to the identification of the pathological process.

Erich[5] is of the opinion that the use of radon seeds offers the most effective form of therapy in the management of the angiofibroma of the nasopharynx. Others also share this opinion, and argue that the seeds can be inserted with comparative ease and a slight amount of bleeding. Emphasis should be placed on employing a minimal number of low intensity seeds which should not be inserted too deep into the vault of the nasopharynx or too close

to the cribriform plate of the ethmoid bone.

Within the past year considerable light has been shed on the efficacy of sclerosing agents in the management of neoplasms which have proved resistant to surgery or other methods of treatment, and in instances where surgery is considered unwise because of cosmetic or other factors. Schultz and Vazirani[6] describe the use of a sclerosing solution, sodium psylliate 5 per cent, in the control of a massive and invasive ameloblastoma which resisted all other attempts at therapy and threatened the patient's life. Stockdale[7] emphasized the well known effect of sclerosing agents in the obliteration of hemangiomas and lymphangiomas.

To the best of the author's knowledge, no suggestion has appeared in the literature concerning the use of sclerosing agents in the management of the angiofibroma. When the shortcomings and hazards of the generally accepted methods of treating the angiofibroma are considered, it appears quite evident that the application of this relatively safe agent might be worthy of consideration and trial.

The case to be reported is of special interest, because this neoplasm was not located in the nasopharynx as is usually the case. Surgery was performed with the aid of the resident in otorhinolaryngology who had seen this patient initially.

■ *Case Report*

A 21 year old white man was admitted to Fitzsimons General Hospital because of a pronounced swelling of the right cheek. This enlargement had been present approximately one year and had gradually increased in size. It was entirely painless. The chief complaint was disfigurement caused by the asymmetry of the cheeks. Family history was noncontributory.

EXAMINATION—General physical examination revealed a healthy, well-developed white man. Laboratory tests were within normal limits. Examination of the face and neck disclosed evidence of a successful cosmetically acceptable closure of a cleft palate and lip which had been accomplished at an early age. Occlusion of the teeth was classified as "moderately good." Palpation of the neck revealed no enlarged nodes. Examination of the nose and pharynx showed absolutely no evidence of a pathologic condition. A mass which measured approximately 5 cm. in diameter was present in the right cheek. These dimensions could not be ascertained accurately, because the posterior extension of the mass was indefinite.

After careful consideration, it was decided not to make a biopsy of this mass prior to surgery. A frozen section was planned at the time of the surgical removal of the growth.

Under endotracheal general anesthesia, the patient's mouth and face were prepared in the usual manner and drapes were placed. A two inch incision was made through the mucosa of the cheek and through the buccinator muscle parallel to the occlusal surface of the teeth and below the parotid duct. Immediately, a firm lobulated tumor mass was visible. The accessible portion of the mass was outlined by careful blunt dissection, but extensive hemorrhage was encountered. Because of the extensive bleeding, a purse string suture was placed around a central

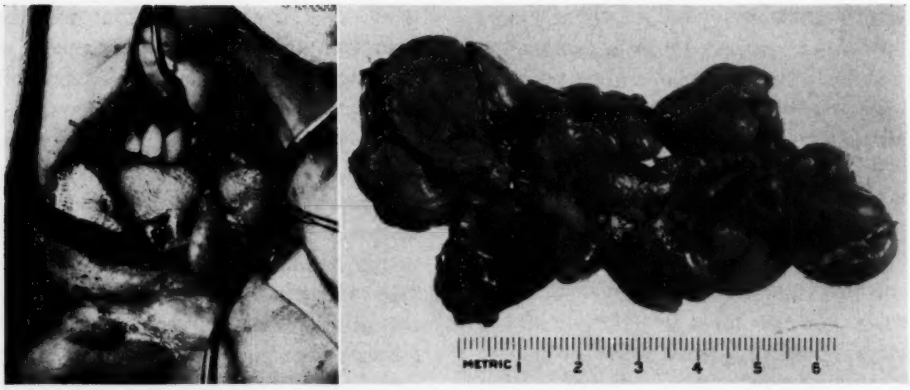

Fig. 1—Left: A large curved Kelly forceps has been placed across body of tumor. The portion exterior to forceps is now ready to be severed from remainder of tumor. Right: Tumor which was removed in two portions has been reassembled. Dimensions of mass were approximately 9 by 4 cm.

region of the tumor prior to taking a wedge of tissue for a frozen section. Profuse bleeding was again encountered which was controlled by tightening the purse string suture.

The report of the pathology department on the frozen section was "benign vascular tumor, probable angiofibroma." Careful dissection was continued around the mass although bleeding was a constant complication. It was found that the lateral wall of the maxillary sinus was eroded but not perforated. As dissection continued, it was determined that the tumor mass extended superiorly and filled the temporal and infratemporal fossae extending posteriorly to the lateral wall of the orbit. Medially, the tumor extended into the pterygomaxillary fossa and posteriorly to the distal border of the lateral pterygoid plate and into the parapharyngeal space. At this point, it was found that the size of the tumor was interfering with visibility. A large Kelly clamp was placed across the body of the mass near the point of extension into the parapharyngeal space (Fig. 1, left) and the superior portion severed from its attachment. Upon removal of the bulk of this tumor mass, the remainder was relatively easily dissected from the infratemporal fossa, pterygomaxillary fossa and parapharyngeal space. When the two portions of the tumor were assembled in their normal relationship, it was found that the mass measured approximately 9 by 4 cm. (Fig. 1, right). Hot saline packs were utilized to control bleeding. After ten minutes, these were carefully removed with no significant bleeding. It was then determined that a perforation extended between the parapharyngeal space and the nasopharynx. No tumor was visible in the nasopharynx. The dead space was closed with no. 00 plain catgut interrupted sutures and the mucous membrane with no. 000 black silk sutures. A polyethylene catheter was next inserted into the right parotid duct and secured with a suture in order to insure that scarring would not produce an obstruction of the duct.

Attention was then turned to the

nose and a right antral window was perforated. The right maxillary sinus was filled with purulent material but no tumor was encountered. A mushroom-tipped catheter was placed into the right maxillary sinus and the right nostril packed with petroleum jelly gauze. A postnasal pack was inserted into the nasopharynx to control hemorrhage and a pressure dressing was applied to the right side of the face.

During the course of the procedure, the patient lost an estimated 1,250 cc. of blood, which was replaced with two units of whole blood. The patient withstood the surgery well, and was returned to the recovery ward in good condition. Examination of fixed slides of the tumor by the pathology department led to the confirmed diagnosis of "angiofibroma" (Fig. 2).

Recovery of this patient was uneventful. Examination of the nasopharynx disclosed no evidence of tumor and roentgenographic examination of the ethmoid and sphenoid sinuses revealed no abnormalities.

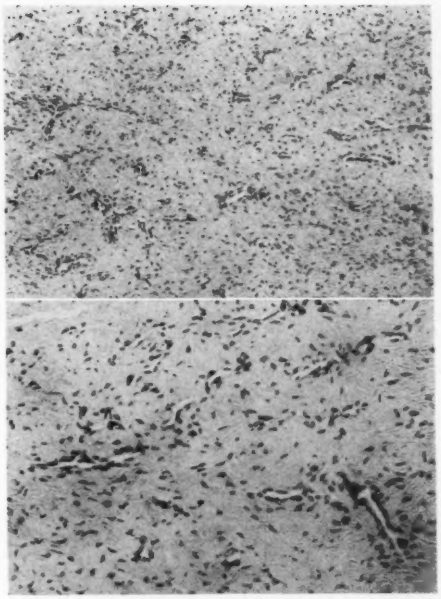

Fig. 2—Above: Many irregularly shaped thin-walled vessels are dispersed in moderately dense stroma (low magnification). Below: Vessels vary in caliber and seem to consist only of endothelium. They lie in fairly dense connective tissue stroma (high magnification)

■ *Summary*

A review of the theories of origin, clinical course and treatment of the angiofibroma has been presented. The origin remains obscure although clinically these tumors are conceded to arise in the nasopharynx and to the pharyngeal side of the constrictor muscle. A patient was seen in whom there was no evidence of the tumor in the nasopharynx.

Treatment has been confined to surgery or irradiation, but each has its hazards and shortcomings. In view of this, the use of sclerosing agents which has proved successful in the treatment of angiomatous and other types of lesions has been suggested.

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The Willmar, Winona and Marshall programs: pilot studies in oral cancer detection 1957-1959

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Cancer control continues to be of utmost concern on a local, state and national basis, for malignancies cause over 250,000 deaths annually in the United States alone. Half of all cancer deaths last year were among Americans under 65 years of age.

Minnesota shares in this total to the extent of over 5,000 deaths annually from cancer of all sites. Of this total, approximately 10 per cent of all cancers are located in the head and neck region. Perhaps half of these arise on the lips or in the oral cavity.

The importance of education, both public and professional, in reaching the goals of an effective cancer program is well recognized. Programs of public and professional education have been developed with undetermined knowledge whether the methods to be employed were truly effective in achieving the desired goals. To measure the effectiveness of a comprehensive program in oral cancer, three successive programs were carried out in 1957-1959. Accurate records were maintained on all examinees, from the preliminary clinical impressions through follow-up on those examinees having abnormalities, in order to determine final diagnosis and therapy employed.

■ *Program Planning*

GERM OF THE IDEA—In 1956, at the request of the professional education committee, Minnesota division, American Cancer Society, a five man cancer committee was appointed by the Minnesota State Dental Association to explore and develop a comprehensive program to stimulate interest in oral cancer control among the dentists of Minnesota.

During one of the early meetings of the cancer committee, the members expressed the idea that a positive program for the detection of oral cancer was needed and that programs employed by other divisions of the American Cancer Society be investigated.

Accordingly, questionnaires were sent to all 60 divisions. Replies ranged from "no formal program" to "workshops conducted with speakers and films provided upon request."

A meeting of the cancer committee was scheduled, at which time the division's executive director suggested the possibility of conducting pilot studies, within a se-

lected county, to consist of a free oral cancer examination on a mass basis. After adoption by the committee members, the plan was submitted to members of the Minnesota State Dental Association and Minnesota State Medical Association, from whom approval was granted.

PURPOSES OF THE STUDY—The numerous purposes for conducting such pilot studies included the following:

1. To provide a positive program for the dentists of Minnesota in the diagnosis of oral cancer.
2. To educate the public concerning the role of the dentists in cancer control.
3. To analyze the effectiveness and efficiency of such a program from several standpoints—cost, public and professional acceptance, professional training, and follow-up of clinical findings.
4. To determine the incidence of benign, premalignant and malignant lesions in a sampling of this type.
5. To ascertain the optimum methods of follow-up.
6. To save more lives.

SELECTION—After acceptance by the committee, several communities were suggested as possible sites for such programs on the strength of three factors: (1) strong leadership of the local American Cancer Society unit's volunteer chairmen; (2) the superior quality of local study clubs or individual professional men; (3) the nature and size of the community and surrounding county.

Willmar, the county seat of Kandiyohi County, an agricultural community of 9,400 inhabitants (most of Scandinavian extraction) was chosen in 1957. Winona, a river town of some 25,000 persons, was the program site in 1958, and Marshall, another agricultural community (7,000 population) was picked for 1959. Two of the programs, the Willmar and Marshall plans, were similar in that a one day mass program was held at the local civic center. The Winona plan was a 30 day program in which each professional office served as an oral cancer detection center.

ADVANCE PROGRAM PLANNING—Plans for administering the programs were initiated with the assignment of a field representative from the Minnesota division office of the American Cancer Society. His duties included planning of county-wide organization, publicity, public and professional education, and program guidance.

In each of the studies the basic plan was presented to the potential participants by representatives of the dental cancer committee. In the Willmar study, the group represented the Willmar Dental Study Club. In the Winona and Marshall studies, the program was planned to include all the dentists and physicians in the communities. The groups had opportunity at that time to reject or accept the plan or to accept a plan modified according to their specifications.

After the plan was ratified, the next item was the choice of the best date for the program. In agricultural communities, weather and crop factors such as harvest seemed potent factors. Examining hours from 8:00 A.M. to 9:00 P.M., were proposed for conducting the mass examinations in the Willmar and Marshall studies.

Normal workday hours were extended to accommodate a large percentage of the rural population. Also, that weekday on which evening shopping hours were provided by the stores was usually suggested as optimal.

The initial action by the field representative began with the announcement of the study to the members of the county American Cancer Society unit. At this time the duties to be carried out during the weeks to follow were carefully outlined to the unit chairmen. These duties included: (1) listing of all clubs, civic organizations and churches within the county, including the names and addresses of the leaders of such groups and the dates of their next scheduled meeting; (2) enlistment of key volunteers to be selected from these groups to form a nucleus of basic county-wide organization; and (3) plans for the role of the volunteer workers during the time of the clinical examinations.

From the list of organizations previously prepared, letters of invitation were mailed to the presidents inviting them to a meeting to learn about the oral cancer clinic and to represent their area in securing advance registrations from families in their respective localities. Individuals were selected to represent each of the county townships, villages and the city in which the program was to be held. (At this point, the field representative arrived in the county to devote about five weeks of full-time, on-the-job field work in preparation for the county-wide pilot study.)

The program was explained, and emphasis was placed on informing the public about the clinic through meetings of the clubs and civic organizations.

The intervening weeks usually brought numerous requests to have the field representative in attendance at various meetings to present the plan and to accept advance registrations.

PUBLICITY—During the early stages of program planning, considerable effort was made to utilize every medium as a source for distributing cancer information.

At the county level, the editors of the daily and weekly newspapers and the program director of the local radio station(s) were provided detailed information about the program and a schedule of important events to follow. Many one minute spot announcements were made during the week preceding the day of the program. Full cooperation resulted in timely news articles published according to the schedule presented by the field representative.

At the state level, contacts were made with radio and television directors, editors of daily newspapers having state-wide circulation, and national press associations.

Colorful posters were displayed in nearly every business establishment within the county, and over 40,000 promotional flyers were distributed through supermarkets, banks and so forth.

Members of the County Ministerial Association were contacted. Articles of cancer information appeared in church bulletins, and announcements were made each Sunday prior to the program date encouraging participation.

PUBLIC ACCEPTANCE—One of the purposes of these pilot studies was meas-

urement of the degree of public acceptance of programs of this general type and, specifically, to ascertain which type gained greater favor.

Sampling of preregistration forms in the Willmar plan was taken at a county fair. The County Fair Board provided a booth free of charge to the local American Cancer Society unit. The booth was colorfully decorated and was attended by volunteers during the four days the fair was in session. For two weeks prior to the studies, a registration and information booth was provided in the lobby of a business establishment located in the heart of the city. Volunteers throughout the county returned completed registration forms to this location.

Analysis of the Willmar figures showed that approximately 94 per cent of the 1,926 examinees who participated responded to preregistration and the other 6 per cent registered at a desk provided in the auditorium on the day of the examination.

Preregistration was similarly effected during the Winona and Marshall programs.

PROFESSIONAL EDUCATION—Approximately six hours of preparatory seminars were conducted for the participating dentists and physicians with informal discussions of the role of the professional man in the diagnosis of oral and facial cancer.

Two instructors, a professor of oral pathology from the University of Minnesota School of Dentistry and an oral or maxillofacial surgeon, conducted these special seminars. Demonstrations of an effective three minute oral cancer examination was carried out by the instructors. A movie was shown to reinforce knowledge of the procedure.

■ *Preparation for Examination*

SITE—A working committee of members of the participating professional groups secured the use of an auditorium or armory for these examinations. The site was selected on the basis of its central location, size and adequate facilities in the Willmar and Marshall programs. The dentist's or physician's own office was employed in the Winona plan.

SETTING AND PHYSICAL PROPERTIES—In the mass examination programs, individual examining booths were constructed from hospital screens and arranged to provide ample electrical outlets for the examiners using headlights. Stage floodlights, directed toward the booths, provided necessary general lighting.

Each booth consisted of one standard chair and a small table. The armamentarium for examination consisted of pen-type flashlights, tongue blades, mouth mirrors, finger cots and 2 by 2 inch gauze sponges. Sterilization of mouth mirrors was effected by the use of a quaternary ammonium compound in glass tumblers. Hand sterilization was performed by washing with a diluted solution of the same compound from a sprinkling bottle. Necessary towels and dentists' gowns were donated by local linen supply companies.

With the exception of the professional armamentarium used for the examinations, all the physical properties were loaned by local business establishments, hospitals and individuals.

Five hundred chairs in the audito-

rium provided adequate seating for those waiting to be examined. More than 100 volunteers served as ushers, receptionists and so forth.

■ *The Examination*

PREPARATORY PROCEDURES FOR PATIENT PROCESSING—In both mass studies, on the morning of the examinations, several hundred examinees appeared outside the auditorium prior to 8:00 A.M., a number of them having traveled distances up to 200 miles.

The preregistered examinee presented himself to one of the three desks arranged in the lobby of the auditorium or armory to receive an examinee's instruction sheet, an education leaflet and an examination form containing his name, address and the name of his family dentist or physician or both. This form was presented to the examining dentist or physician.

Volunteers ushered the examinee to one of 500 chairs arranged for waiting purposes. The physical arrangements of the auditorium, plus the use of instruction sheets, provided for maximum efficiency in patient processing.

The areas of examination included lips, tongue, gingiva, cheek mucosa, floor of the mouth, palate, and oral pharynx. Cervical adenopathy and gross skin abnormalities were also recorded on the examination forms.

Abnormal findings were not reported to the examinee at this time. All examinees were advised that the clinical findings would be forwarded to their family dentist or physician in the near future.

In the event that a suspicious lesion was seen and required additional study to determine a preliminary diagnosis, four dental and medical consultants were provided to assist.

In the Willmar study 15 dentists participated. Each saw in excess of 120 examinees during the one day clinic. Because of the greater number of professional participants in the Marshall study, each man only saw about half that number. The time required for examining each participant was approximately three minutes, with additional time for those participants having abnormalities.

Nursing homes within the county were included in the Willmar study, but not in the Marshall study. Two teams, each composed of five examiners, their assistants and one consultant, went to the nursing homes to examine 176 residents.

Nineteen hundred and twenty six persons were examined at Willmar and 2,300 were seen at Marshall.

Oral cancer is far more prone to occur among persons 45 years of age and over. Although all adult persons were encouraged to participate in the mass examination, special emphasis was directed toward this age range. Without obtaining age data from the examinees, observation during the examinations led to the belief that approximately 75 to 80 per cent were in the age group of 45 years and over.

The Winona program, in contrast to the Willmar and Marshall studies, was carried out in the office of the participating dentist and physician. The governor's office was contacted and a 30 day period declared Mouth Cancer Month. During this period all persons coming into a dental office received a three minute examination for any oral abnormalities. The observations were recorded on the same

form used in the other studies. Similarly, all patients presenting themselves at a physician's office received a similar oral examination regardless of their presenting complaint. If an abnormality was discovered, the patient was referred to a consultation board that met once a week for the 30 day period. He was accompanied by his dentist or physician or both. The board consisted of an oral pathologist, a dermatologist and a general surgeon. The function of the board was to re-examine the patient and to aid in biopsy if need arose. Two thousand seven hundred and twenty-five patients were examined. The biopsy was to be performed by the dentist or physician whose patient was involved. Sixteen dentists and 18 physicians participated in this program.

■ *Follow-up Plans*

In the Willmar study, since biopsy was not performed, the procedures used for direct follow-up to determine the final diagnosis and therapy to be employed were to be carried out by the family dentist or physician indicated by the examinee. On the basis of preliminary clinical findings, the consultants suggested follow-up procedures such as biopsy and direct laryngoscopy for those examinees having abnormalities.

A follow-up form was prepared, listing the name and address of the examinee and the preliminary clinical impressions as recorded on the examination form. These follow-up forms, together with a covering memorandum, were mailed to the respective dentist or physician or both for continued follow-up.

Some reclassification was believed necessary, and a revised group of 68 cases deemed "suspicious" were assigned to the follow-up category. The task of follow-up proved to be the most difficult phase of the project. Repeated letters and follow-up forms were employed. Finally a group of 13 cases deemed "highly suspicious" were assigned to the county nurse to determine their disposition.

In the Winona study, follow-up was effected by biopsy of suspicious lesions at the consultation board meetings.

In the Marshall study, biopsy was to be performed in an auxiliary room provided for this procedure. Patients with suspicious lesions were to be referred by the examiner to the consultation room. There he was to be seen by one of the consultants, and if biopsy was deemed desirable, it was to be performed at that time by his own dentist or physician who was to be called to the room for that purpose.

■ *Results*

In the Willmar and Marshall studies the examination forms were collected at the end of the day and sorted into three categories according to the preliminary clinical findings: (1) negative findings; (2) follow-up, and (3) miscellaneous findings.

A report, containing the name and address of the examinee plus the preliminary clinical findings, was mailed to the examinee's family dentist or physician or both, as indicated on the preregistration card. For those individuals who did not designate the name of a family dentist or physician, the report was mailed to the county nurse who contacted each individual having abnormalities for the name of a local dentist or physician to whom

Table

Results of pilot studies in oral cancer detection

Study	Total no. patients examined	Approx. % of city population	No. cases clinical "precancer" (skin and oral)	No. cases confirmed cancer (skin and oral)
Willmar	1,926	20	7	8
Winona	2,725	11	0	0
Marshall	2,300	33	8	6

future follow-up information might be sent.

The results are summarized in the table.

In the Willmar study 90 patients were thought to have benign tumors or non-neoplastic conditions and 51 were placed in the "suspicious category." Of these 141 patients, 68 were separated for follow-up. This was effectively carried out in only 42 of the 68 cases.

Forty patients were referred to the consultation board in the Winona study. None of these patients proved to have precancerous or cancerous lesions.

■ *Cost Analysis*

Total costs in the development of a program of this nature may vary considerably within each locality. Items such as printing, postage, telephone calls, photography, field trip expenses, rental of physical properties, armamentarium for conducting the examinations and honoraria for lectures are the usual budgetary items. Since any of these may vary with the type of study, donation by the groups concerned, plus many local factors, it is impossible to establish any cost formula. However, it is possible to gain some general measure of total costs involved in the three studies.

Itemized accounting of the actual expenditures totaled $1,454.18 in Willmar, $791.03 in Winona, and $1,157.61 in Marshall. On the basis of these expenditures, the cost for conducting this pilot study averaged $0.76, $0.29, and $0.50 per examinee, respectively.

The major items of expense included printing of the distribution leaflets, posters, registration and examination forms, and photography. These items averaged 54 per cent of the total costs in the three studies.

It is obvious from these figures that mass examinations of the Willmar-Marshall type are more expensive than office programs of the Winona type. The figures suggest that they are about twice as expensive. Is this an argument for the adoption of the office type program? The impression is quite the contrary. The evaluation will be discussed in the analysis.

■ *Analysis and Summary*

In terms of the number of examinees who participated, the Willmar and Marshall studies should be considered highly successful. It is possible that programs of this type would be less successful in larger communities. The one day program was characterized by considerable enthusiasm that was not present in the 30 day program at Winona. Time seemed to vitiate interest in such a program; this probably was partially responsible for the failure

to uncover any case of oral cancer during the 30 day period.

It will be noted that an unusually high percentage of oral cancer was found. Most of the frank cancers were found in men. If the "normal incidence" of 6.4 per 100,000 for men is valid, then a most unusual finding was obtained. However, it must be realized this was a highly biased survey. First, the public was made aware of the nature of the program, and patients having suspicious lesions were prone to participate. Second, younger individuals were excluded from the survey, the population examined being a "cancer age" group. Third, the population of Willmar and Marshall was heavily agricultural, a group receiving considerable actinic radiation. Last, the group was heavily weighted with individuals of Scandinavian and Northern European extraction, people whose skin and lips are not well protected by melanin pigment. All of these and possibly other factors made for the significantly elevated rate of cancer observed.

Although of similar mass design, the Willmar and Marshall programs differed in two respects. In the latter, biopsy was performed at the time of the original examination. In addition it was a joint dentist-physician venture. Both factors seemed to aid and strengthen the plan. Follow-up was greatly improved. Mutual respect was engendered both at the training session and during the actual conduct of the program.

Presented as part of a panel discussion "Stimulated tumors in oral tissues," one hundred and first annual session, American Dental Association, Los Angeles, October 18, 1960.

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■ Staphylococci

During the past two years the technology of modern medicine has been mobilizing to contend with a spreading prevalence of purulent infection in which that same technology has played an equivocal role. The prevalent infections manifest themselves in a variety of conditions, from abscesses and rashes to fatal blood poisoning and pneumonia. All the cases are traceable to certain strains of the familiar and ubiquitous staphylococcus. These strains are distinguished by their communicability and virulence, and by high resistance to antibiotics. They are, in fact, the product of selection by antibiotics; by bad luck, these resistant strains happen to carry the most harmful traits of their genus. *Stuart Mudd, Scientific American, January 1959.*

Viable mixture of lactobacillus acidophilus and bulgaricus in treatment of herpetic and aphthous stomatitis

■ *Paul L. Abbott,* D.M.D., Norfolk, Va.*

The control and treatment of herpetic and aphthous stomatitis can be difficult. Herpetic stomatitis usually persists for 14 to 21 days, and methods of treatment to date have been relatively ineffective. The local application of caustics to the lesions is used by some, although the results obtained are temporary and the method is impractical when the condition is generalized. Warm mouth rinses provide a measure of comfort for the patient, but do not alter the course of the disease. The intradermal injection of smallpox vaccine has been recommended by Savitt and Ayres.[1] Antihistaminic drugs were reported to be ineffective by Kutscher, Silvers and Zegarelli.[2] Chlortetracycline hydrochloride is of value in controlling discomfort due to secondary infection. Ramfjord[3] reported varying degrees of relief from recurrent herpetic gingivostomatitis after administration of gamma globulin.

In an attempt to find a more effective medication for the treatment of herpetic and aphthous stomatitis, a viable mixture of *Lactobacillus acidophilus* and *bulgaricus* (Lactinex) has been evaluated. This mixture is available in two forms: tablets and granules. One packet of granules (1.0 Gm.) is equivalent to four tablets. The mixture is administered by mouth, followed by a glass of milk. The milk acts as a culture medium for the acidophilus and bulgaricus bacilli.

■ *Treatment of Children with Herpetic Gingivostomatitis*

Between July 1, 1959, and December 31, 1959, 46 children were referred from the pediatric service to the dental service at the U. S. Naval Hospital, Jacksonville, Fla., for treatment of acute generalized herpetic gingivostomatitis. The ages of the children ranged from 9 months to 12 years. The most commonly reported patterns of the disease included a cold, sore throat, fever and malaise followed by the generalized vesicular eruptions occurring on the lips, tongue, buccal mucosa, palate and oral pharynx. The vesicles ruptured, leaving bleeding ulcerations that were readily susceptible to secondary bacterial infection.

Because of tenderness in the oral cavity, the patients refuse to eat or take fluids orally; therefore, the major concern, besides pain control, becomes that of maintaining adequate fluid balance and preventing dehydration. For example, two of the children in the group studied had oral lesions so severe that dehydration was imminent; hospitalization and intravenous administration of fluids became necessary.

In this study 44 patients were given a three day supply of the viable mixture of *Lactobacillus acidophilus* and *bulgaricus* in the tablet or granule form, and were instructed to chew four tablets or to take one packet of granules four times a day followed by a glass of milk. The patient was further instructed to report on the status of the lesions at the expiration of three days. If healing was not complete, additional medication was supplied. A progress report along with a brief history was kept on each patient, and the dates the soreness was relieved and the lesions healed were noted.

The only medications given the two hospitalized children with herpetic gingivostomatitis was a thick *Lactobacillus acidophilus* and *bulgaricus*-milk paste inserted in the buccal vestibule four times a day along with saline solution and 5 per cent glucose and water given intravenously. Within 24 hours each child was able to take fluids orally. The herpetic gingivostomatitis was completely healed in five days.

The results of treatment in the 46 children with herpetic gingivostomatitis were as follows: in 16 per cent the lesions healed in two days, in 43 per cent the lesions healed in three days, in 22 per cent the lesions healed in four days, in 11 per cent the lesions healed in five days, and in 8 per cent the lesions healed in six days.

■ *Treatment of Herpes Simplex and Aphthous Stomatitis*

Because of the excellent results obtained in treating the children with generalized herpes, *Lactobacillus acidophilus* and *bulgaricus* was given to a group of ten adults with past histories of recurrent herpes simplex lip lesions.

The mixture was given during the burning or itching stages, before vesicular eruption, in an effort to abort the lesions. In 100 per cent of the patients, the vesicles never erupted. Although the group tested was small, it would appear that *Lactobacillus acidophilus* and *bulgaricus* is of value as preventive therapy in patients who are plagued with recurrent herpes simplex of the lip.

Also included in the clinical observation were 22 cases of recurrent aphthous stomatitis in adults treated with *Lactobacillus acidophilus* and *bulgaricus*. These patients ranged in age from 15 to 53 years. The majority of the lesions were single and occurred in various regions of the mouth. There was no apparent agreement among the patients as to the etiology of the aphthous lesions; however, the average untreated healing time was reported to be 10 to 14 days.

This group was treated in the previously described manner, that is, four *Lactobacillus acidophilus* and *bulgaricus* tablets four times a day followed by a glass of milk.

The results of the treatment in patients with aphthous stomatitis were as

follows: in 9 per cent of the 22 adults the lesions healed in one day, in 23 per cent the lesions healed in two days, in 36 per cent the lesions healed in three days, in 23 per cent the lesions healed in four days, and in 9 per cent the lesions healed in five days.

■ *Comment*

In patients with aphthous ulcers, the soreness usually was relieved within 24 hours.

Lactobacillus acidophilus and *bulgaricus* does not prevent recurrence of the aphthous lesions, but patients reported complete freedom from the ulcers while taking the mixture. For example, one patient stated that drinking any citrus juice would cause eruption of the aphthous ulcers. By taking two tablets per day for a period of time, this patient could drink any citrus juice without occurrence of ulcers. Once the administration of *Lactobacillus acidophilus* and *bulgaricus* was stopped, citrus juice again caused the aphthous lesions. The reason for such a phenomenon is not clear, and more work is needed to determine what dosage of *Lactobacillus acidophilus* and *bulgaricus* would prevent the ulcers.

■ *Summary*

Forty-six patients with herpetic gingivostomatitis, 22 patients with recurrent aphthous stomatitis and 10 patients with herpes simplex of the lip were treated with a viable mixture of *Lactobacillus acidophilus* and *bulgaricus*, and the results were observed clinically. In 81 per cent of the patients, the herpetic gingivostomatitis lesions were cleared in four days. In 68 per cent, the aphthous lesions were cleared in three days. This represents a ten day reduction in healing time as compared with untreated cases. When the *Lactobacillus acidophilus* and *bulgaricus* mixture was given to the patients suffering from recurrent herpes simplex of the lip during the burning and itching stages of the disease, vesicular eruption was aborted in 100 per cent of the patients treated.

■ *Conclusion*

The results of this clinical observation indicated that a viable mixture of *Lactobacillus acidophilus* and *bulgaricus* is effective in the treatment of herpetic and aphthous stomatitis. The mode of action of this bacterial mixture on these diseases has not been determined. Further laboratory and clinical studies of this viable mixture of *Lactobacillus acidophilus* and *bulgaricus* are indicated.—*413 Saddle Rock Road.*

The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

Lactinex was supplied by Hynson, Wescott and Dunning Company, Baltimore.

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Management of maxillary fractures

■ *Jack B. Caldwell,* D.D.S., M.Sc., Denver*

Maxillary fractures present many varied problems in treatment. In order to discuss maxillary fractures properly, a simplified classification is proposed. Common sense and good judgment are necessary in treating fractures, and it is suggested that the simplest technics applicable in each instance should be utilized. Consultations with other surgical specialists such as neurosurgeons should be sought.

Today a high percentage of facial injuries are sustained in automobile accidents with devastating results. It is not unusual to admit four or five patients from one accident, some of whom must be placed on the seriously ill list. To discuss the subject of maxillary fractures intelligently, it is first necessary to recognize the problems imposed by this violent, shattering trauma. It is impossible to restrict remarks to fractures of the maxilla, when most often other facial bones and the mandible are injured also.

To establish a basis for discussion the following simple classification of maxillary (midfacial) fractures is proposed:

1. Uncomplicated: (the horizontal, pyramidal or unilateral maxillary fracture with no other facial bone fractures).

   a. New (those which have been sustained only a few hours or two or three days previously).

   b. Old (those which occurred several days, weeks or months previously and for various reasons have not been treated).

2. Complicated (those in which there are multiple facial bone fractures and frequently other injuries also—that is, head, chest, abdominal, extremities).

   a. New (as defined in 1, a).

   b. Old (as defined in 1, b).

Because of space limitations, the subject will be discussed in generalities. Since the extent of injuries and the general condition of patients varies so greatly, it is hardly possible to outline specific methods of treatment. In fact, when dealing with trauma, one must have a knowledge of all acceptable treatment methods and have the ability to select and apply treatment technics to the given problem.

The surgeon must be guided in management of maxillary fractures by interpretation of roentgenograms and by a careful clinical evaluation. In my opinion, the latter deserves emphasis since good diagnostic roentgenograms frequently are difficult to obtain in severely injured patients. Observations for abrasions, lacerations, edema, facial asymmetry, ecchy-

mosis and clinical findings of displaced occlusion, irregularities of contour of the dental arches, crepitus, painful response to palpation or movement, interference with function and traumatic anesthesia, may guide the examiner to the diagnosis. Roentgenographic surveys must be considered as adjunctive. Experience, judgment and common sense then decide the course to pursue, and the simplest methods of treatment available are the ones which should be selected.

■ *Uncomplicated Fractures*

Uncomplicated maxillary fractures are uncommon; usually there are concomitant fractures of other facial bones. Presuming, however, that the maxilla only is fractured, it is ordinarily displaced posteriorly and impacted or "floating" freely. The problem is simply one of returning the maxilla to normal position using occlusion as a guide, and providing a means of fixation during healing. If the maxilla is displaced and impacted, the simple application of intramaxillary multiple loop wiring to both arches with light intermaxillary elastic traction will often suffice in treatment. The elastic traction should be just heavy enough to guide the maxillary teeth into normal occlusion. If there is a tendency for the mandible to open with resulting movement of the maxillary fracture, it may be necessary to counteract this movement by placement of a head harness and chin support. Fractures which cannot be completely immobilized in this simple manner may require more positive support. For example, the so-called "floater" must be reduced to normal relation, occlusion re-established and a positive means of immobilization adapted. Wire suspension from a mandibular arch bar to the zygomatic arches or to the rim of the orbit is a popular method of support. It produces excellent results when there are no other facial fractures and the intact mandibular arch may be used as a guide to reduce the maxilla to normal occlusion and relation. It must be recognized that this type of wire suspension often must be directed posterior to a vertical plane and therefore against re-establishment of occlusion.

Other methods of support may be indicated when the problem is one of pulling the maxilla forward as well as holding it upward. Again, arch bars or cast metal labial splints are necessary and the plaster headcap still maintains an important place in our practice. The fractured maxilla requiring support directed anteriorly as well as upward may be suspended by interstitial wires from the mandibular arch bar and directed through the cheek to appropriate attachments on the headcap.

When more rigid fixation is desirable, metal rods can be soldered to the arch bars prior to their insertion. From one of these rods, which protrudes 3 to 4 inches out of the mouth, a connecting rod is securely fixed by Roger Anderson adapters to the plaster headcap. Probably the most rigid means of fixation available is provided by placement of a Kirschner wire or Steinmann pin through the symphysis of the mandible from which rod attachments to a headcap are placed. The maxillary arch is fixed to the mandibular by arch bars and with the Steinmann pin or Kirschner wire in the mandible securely attached to an extracranial appli-

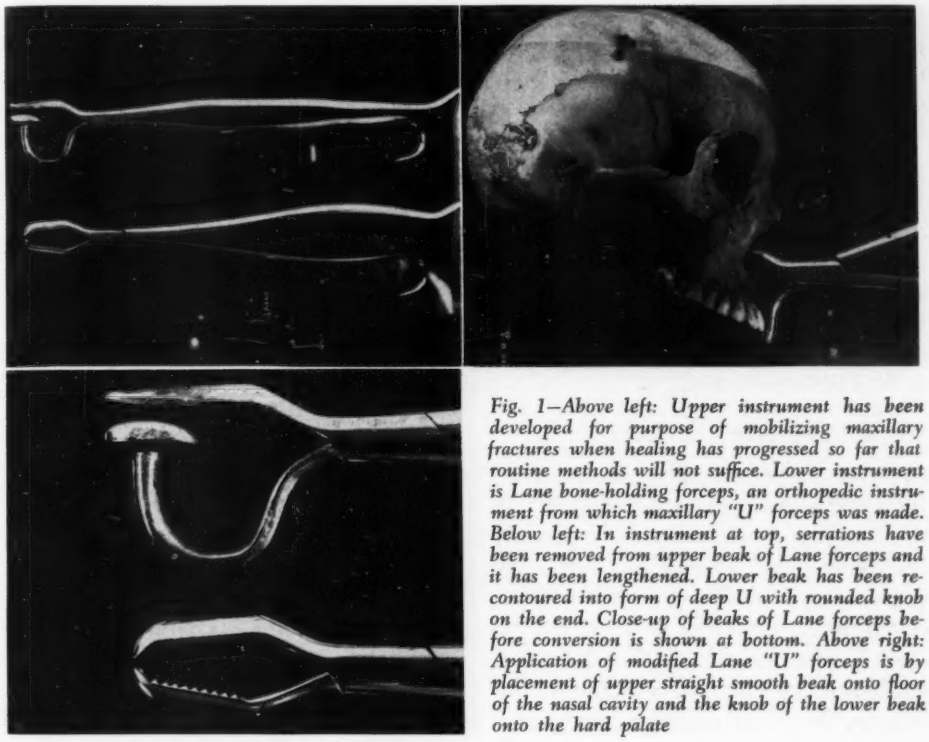

Fig. 1—Above left: Upper instrument has been developed for purpose of mobilizing maxillary fractures when healing has progressed so far that routine methods will not suffice. Lower instrument is Lane bone-holding forceps, an orthopedic instrument from which maxillary "U" forceps was made. Below left: In instrument at top, serrations have been removed from upper beak of Lane forceps and it has been lengthened. Lower beak has been recontoured into form of deep U with rounded knob on the end. Close-up of beaks of Lane forceps before conversion is shown at bottom. Above right: Application of modified Lane "U" forceps is by placement of upper straight smooth beak onto floor of the nasal cavity and the knob of the lower beak onto the hard palate

ance, movement of fractured facial bones is reduced to a minimum. In my opinion, all of the methods used have their disadvantages. Plaster headcaps certainly leave much to be desired, especially if the patient has a round head, or a heavy growth of hair which is not cut. There are occasions when this type of fixation is essential, however, and therefore headcaps must not be discarded from the modalities of treatment.

Uncomplicated old maxillary fractures are not encountered often. When they are seen, however, there is usually malocclusion with open bite anteriorly and interceptive contact of occlusion posteriorly. Healing occasionally may have progressed to such a degree that an intractable fibrosis is established and traction methods, either intraoral or attached to a headcap or Balkan bed frame, will not produce reduction. In such instances, manual mobilization of the malunion can be accomplished by use of a modified Lane bone-holding forceps which we have developed for this purpose (Fig. 1, above left). The serrations have been ground off of both beaks to minimize trauma to mucosa. The upper beak has been straightened and lengthened. The lower beak has been recontoured into the form of a deep U with a rounded knob on the end (Fig. 1, below left). Application of the instrument is by placement of the upper

beak onto the floor of the nasal cavity with the knob of the U lower beak resting on the hard palate (Fig. 1, above right). By manipulation, using a careful rocking motion, the impacted or malunited fracture usually can be freed enough to permit reestablishment of occlusion. Open surgical refracture should not be resorted to unless every other effort fails, and even then, results, in our experience, have not been very satisfactory. An appropriate method already described for new cases is then utilized in fixation.

■ *Complicated Fractures*

Complicated maxillary fractures offer many challenges. New fractures in this category are encountered frequently, and often other injuries preclude early definitive care. A few years ago nothing was done for the facial injuries of a patient in coma with basal skull fractures, cerebrospinal rhinorrhea and life in the balance. Occasionally, by the time surgery could be undertaken, irreparable deformity had occurred. Today, however, in a large percentage of these patients with severe midface traumatic injuries, limited treatment can be provided at an early date. While certain other emergency procedures such as tracheotomy, suture of open wounds or casting of fractured long bones are being attended to, initial remolding of facial fractures to contour can be achieved also. This amounts to digital manipulation of the fractured and displaced parts such as movement of the maxilla forward manually, elevation of malar bones with a gloved index finger and possibly remolding of the floor of the orbit via the maxillary sinus. Much can be achieved, especially in the patient with severely comminuted, multiple injuries. Once this remolding has been accomplished, further intervention can be delayed until the patient's vital signs have stabilized and he can be given anesthesia without jeopardizing his ultimate recovery. It is remarkable that in a few severe cases of this type, the only definitive treatment required after a week or two of convalescence has been placement of dental arch appliances and traction to restore occlusion. Re-elevation of malar bones and transosseous zygomatic frontal wiring may be needed as well as other suspension wiring or devices, open reductions, and so on, but very often, extravagant surgery is not needed in the secondary definitive stages of treatment. Close liaison with the neurosurgeons in instances of severe complicated midface trauma, therefore, is essential since these patients are usually admitted initially to that service. This relatively simple remolding procedure frequently will save extensive surgical intervention later, and may even mean the difference between a good cosmetic and functional result or a lifelong facial deformity. Furthermore, neurosurgeons usually are interested in early reduction of facial fractures, because replacement of bones to relatively normal position tends to aid in an earlier sealing off of cerebrospinal rhinorrhea.

At this point a word of caution must be injected regarding open reductions, surgical entrance to the maxillary sinuses and other early surgery in midface fractures. In some patients, comminution is so great that use of direct transosseous wiring or suspension wires is futile. Furthermore, to expose bone sufficiently to permit access for drilling holes and wir-

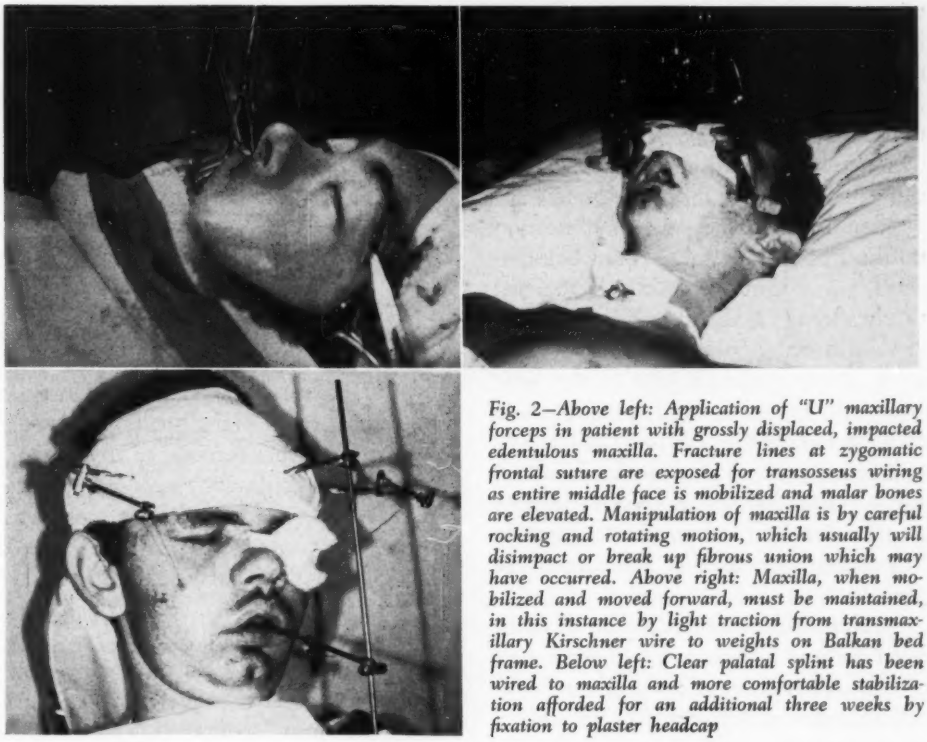

Fig. 2—Above left: Application of "U" maxillary forceps in patient with grossly displaced, impacted edentulous maxilla. Fracture lines at zygomatic frontal suture are exposed for transosseus wiring as entire middle face is mobilized and malar bones are elevated. Manipulation of maxilla is by careful rocking and rotating motion, which usually will disimpact or break up fibrous union which may have occurred. Above right: Maxilla, when mobilized and moved forward, must be maintained, in this instance by light traction from transmaxillary Kirschner wire to weights on Balkan bed frame. Below left: Clear palatal splint has been wired to maxilla and more comfortable stabilization afforded for an additional three weeks by fixation to plaster headcap

ing may interfere so greatly with blood supply to the part that there will be sequestrum formation or nonunion may occur, or both. In such instances it is better to reduce surgically major segments only; that is, open direct transosseous wiring of malar bones at the zygomatic frontal fracture and then proceed to the mandible if it is fractured. When it also has been perfectly reduced by open methods, the comminuted maxillary pyramidal compound fracture can then be accurately repositioned using the mandible and malar bones as anatomic guides as well as the occlusion of the teeth. Open reduction of condyle fractures, if present, is usually indicated.

In old complicated cases where the afore-mentioned "early remolding" has been neglected, many problems arise. If more than ten days or two weeks have elapsed since the injury, it is virtually impossible to disimpact or break down fibrous malunions and restore normal facial contours by simple routine methods. Use of the "U" maxillary forceps, the modified urethral sound of Boudreaux,[1] and even chisels and mallets, may be undertaken. Fractures which do not reduce entirely by direct surgical forces may be further benefited by traction devices. To obtain additional forward movement of a fractured maxilla, weighted traction from an orthopedic bed frame to a Kirschner

wire or Steinmann pin in the maxilla may be helpful. Edentulous patients present even greater problems if early treatment has been inadequate. Recently, in a patient admitted two weeks after injury, it was necessary to disimpact the maxilla using a "U" forceps, maintain the forward position by Kirschner wire and traction until a clear palatal splint could be fabricated, wired to the maxilla and attached to a headcap (Fig. 2). It may be necessary to subject malar bones to similar devices, using Roger Anderson pins in the bone or a wire looped around the zygomatic arch. Resorting to these methods usually is not productive of ideal results; however, patients who have been severely injured usually can be fixed so that acceptable function and acceptable appearance are provided.

The ultimate objectives in all treatment of facial injuries are: (1) restoration of normal occlusion of the teeth and normal function of the jaws, (2) prevention of residual facial disfigurement and (3) early return of the patient to a productive life. After initial lifesaving measures have been carried out, the number one objective is restoration of occlusion and function of the jaws. By all means, then, this work falls into the scope of the specialized dentist—an oral surgeon. Consultations with other specialists are often mandatory, especially when the orbit is involved. It is essential that tests for vision are done before and after surgery for midfacial fractures when orbital bones are involved. Responsibility for treatment of traumatic injuries to facial bones, in which the dental arches are involved, must be delegated to the oral surgeon; however, it is an advantage to the patient to work in close cooperation with other interested services.

■ *Summary*

1. For convenience of discussion of the management of maxillary fractures, they have been simply classified as uncomplicated, complicated, new and old.

2. Simplicity in treatment methods is paramount. Gradation from simple technics to the more complicated approaches of treatment are discussed briefly. Common sense coupled with good judgment is the foundation for good management in facial trauma.

3. It is recommended that prompt remolding of displaced parts to a semblance of normal contour be undertaken in new complicated cases of midface trauma when early definitive treatment is contraindicated. Emphasis is placed particularly on disimpaction and anterior movement of midfacial bones which have been driven posteriorly.

4. A solution to the perplexing problem of reduction of impacted or old maxillary fractures has been suggested with the introduction of a modified Lane bone-holding forceps and its application.

5. It must be remembered that trauma to the midface usually is delivered from the front and that the major midface bones must be pulled out (anteriorly) and kept there during healing. There has been no good substitute found yet for extracranial fixation (the plaster headcap) to meet certain of these requirements.

6. Cooperation and close liaison with other interested surgical specialties is recommended in instances of midfacial trauma, especially for those patients who have sustained injuries to the brain and orbit.

*Colonel, Dental Corps; chief, dental service, Fitzsimons General Hospital.

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Removal of sialoliths from the hilus and adjacent duct of the submaxillary gland via the oral approach

■ *Richard J. Burch, D.D.S., Tucson, Ariz.*

Removal of a sialolith from the hilus of the submaxillary gland through an intraoral approach should not be attempted if the stone is relatively small. Consideration must be given to the anatomic structures in the floor of the mouth such as the lingual nerve and artery. Anesthesia may be either local with premedication or general, but the important consideration must be the control of the tongue and floor of the mouth during the procedure. The wound is closed only lightly and superficially to prevent hematoma formation, salivary retention and excessive edema.

Successful removal of calcified masses from the hilus of the submaxillary gland and the adjacent duct is dependent on several factors such as the size of the stone, the character of the surface of the stone (rough or smooth), the exact location of the mass and the anatomy of the region. The latter varies considerably from patient to patient and should be taken into consideration prior to deciding on an oral approach. In general it is believed that open surgery, wherein each structure is positively identified, is better than a blind approach in dealing with this problem. Blind cutting into this region is hazardous because of important structures such as the lingual nerve and the lingual artery. If the stone is small, and is located in the hilus area or in the adjacent duct, the blind approach should not be used. This contraindication does not apply to instances in which a large and readily palpable stone is in the anterior two thirds of the main duct in the floor of the mouth. In any approach, failure produces scar tissue and renders subsequent definitive treatment very difficult from the oral approach and complicates the removal of the gland in order to solve the problem.

■ *Instruments*

The choice of instruments should include a silver probe and long-handled knives (no. 15 blade) and curved, double-sharp dissecting scissors, an ample number of hemostats, an assortment of no. 00, 000 and 0000 silk sutures and no. 000 and 0000 plain gut sutures and a small, curved surgical needle. Suction and gauze sponges, needle holders and other items

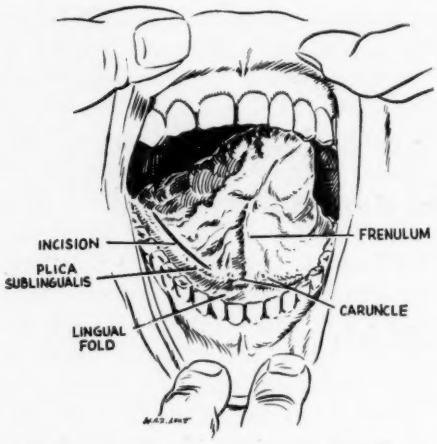

Fig. 1—Incision for removal of sialolith

to support the usual surgical procedure should be at hand. Ordinarily, the only special instruments required are the probe for probing the duct and a good pair of curved, double-sharp dissecting scissors with a 6 inch handle.

■ *Anesthesia*

The decision whether to use general anesthesia depends on the estimate of the manageability of the patient. The procedure can be accomplished readily on selected patients under balanced block anesthesia, after adequate sedation by the intravenous route. In general, sedation should consist of morphine sulfate ¼ grain, scopolamine 1/150 grain and secobarbital sodium 150 to 250 mg. In the oral approach the tongue must be controlled absolutely, and patient management is essential for the success of the procedure. If any doubt exists as to the capability of managing the patient under sedation and local anesthesia, general anesthesia should be employed.

■ *Position of Patient*

The patient may be in a semisupine position in a dental chair or flat on an operating table. Generally it is easier to operate with the patient on an operating table, as two assistants are necessary. One person assists with the actual surgery and the other elevates the submaxillary gland with extraoral finger pressure. Special types of clamps have been described for this; however, they are not considered especially desirable and do not take the place of the second assistant.

■ *Incision*

Prior to making the incision, two no. 00 silk sutures doubled are placed through the lateral margin of the tongue at the posterior and middle portion with hemostats clamped onto the suture to serve as retractors for tongue control. A suture of sufficient size should be utilized so that considerable traction can be exerted without cutting through the margin of the tongue. Other retractors usually are not necessary. Care should be used in making the incision, since the mucous membrane offers little resistance to a Bard-Parker blade. Before the incision is made, the plica sublingualis is identified and the initial incision is made into the mucous membrane approximately halfway between the plica and the tongue, beginning at the very posterior aspect of the visible floor of the mouth and extending anteriorly for 4 to 5 cm. (Fig. 1). After the mucous membrane has been divided, the scissors should be utilized to expose the deeper structures by blunt dissection. Ordinarily, bleeding is of no consequence; therefore, no infiltration of local anesthetic solution is made in the imme-

diate operative field. Vasoconstrictive infiltration can be utilized if unusual bleeding is encountered.

■ *Anatomy*

The identification of the major structures is imperative (Fig. 2). Great variation is encountered in the size and location of the two principal structures: the lingual nerve and the duct of the submaxillary gland. The lingual nerve may vary from 1 to 3 mm. in diameter. The duct itself varies greatly in size and in approximately the same variation of 1 to 3 mm. in diameter. The nerve lies close to the lingual margin of the angle of the mandible opposite the mandibular third molar and courses under the duct 1 to 3 cm. anterior to this point. On some occasions they seem to be parallel for a considerable portion of this distance and on other occasions the lingual nerve is found on the lingual aspect of the duct of the submaxillary gland. The lingual nerve varies from a white, shiny, readily identifiable nerve trunk to a large, off-white structure that appears to be enveloped in a type of sheath which is not as distinctive as the ordinary nerve trunk.

The submaxillary duct, as noted previously, varies considerably in size. If it has been involved with a low grade infection over a considerable period of time, it will be quite large, firm and hard. Occasionally a chronic abscess is found enveloping the stone, the duct and adjacent fascial structure with resultant circumscribed fibrosis. After the nerve trunk and the duct are separated and isolated by semisharp and blunt dissection with the scissors, a rubber band may be utilized to pass under both structures for additional tension, control and visibility. When the proper approach is made, a considerable portion of the submaxillary gland can be readily visualized lying superior to the posterior fibers of the mylohyoid muscle. A probe passed down the duct from Wharton's orifice can then be seen to enter the gland at the hilus region for positive identification. If the stone is fairly large it can be located easily with a point of a hypodermic needle and can then be exposed by a linear incision through the

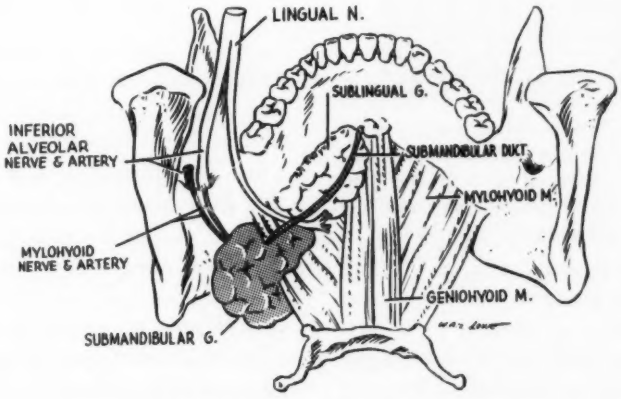

Fig. 2—Anatomy of operative region

tissues overlying the calculus. The stone then can be delivered from the hilus with a curet. No hesitancy is necessary in cutting down on the glandular portion of the hilus in order to expose the stone.

■ *Suture*

Suturing of the duct with absorbable material is not generally indicated unless an unusually large incision has been necessary to deliver the stone. If the ductal incision is more than 1 cm. in length, then repair should be considered. For such repair a very fine, plain gut suture no. 0000 or 00000 is utilized. The tissues are so thin in this region that a minimal number of buried sutures should be placed. Furthermore, care should be used to prevent constriction of the duct; generally it is better not to suture than to incur the risk of constriction. Ordinarily a suture repair of the hilus region of the gland is not indicated nor are sutures used in repair of the fascia enveloping the region. The mucous membrane is repaired with no. 0000 silk suture, either interrupted or continuous. A completely tight closure of the incision is not necessarily desirable since it may not allow secretion of saliva into the mouth. An auxiliary duct may form in the wound area, thus allowing the gland to secrete so that restriction of flow is not a problem.—523 *North Tucson Boulevard*

An effective and simplified method for cardiac resuscitation

■ *Russell I. Erickson,* D.D.S., M.S., and Merle L. Hale,† D.D.S., M.S., Iowa City, Iowa*

The relatively simple closed method of cardiac massage has resulted in an over-all survival rate of 72 per cent in a series of 20 patients. In comparison, open chest cardiac resuscitation has resulted in a 29 per cent survival rate. The method employed in closed chest resuscitation is described.

In the modern practice of oral surgery the surgeon must be ever mindful of the complication of cardiac arrest on the operating table. Much has been written during the last decade in oral surgery journals[1-6] to bring this to the attention of the profession. Nevertheless, it is with trepidation that the oral surgeon contemplates taking scalpel in hand, opening his patient's chest and accomplishing manual cardiac resuscitation.

It now appears that a simple and effective form of cardiac massage can be accomplished without opening the patient's chest. This article is presented in

Fig. 1—Position of resuscitator's hands during external cardiac massage

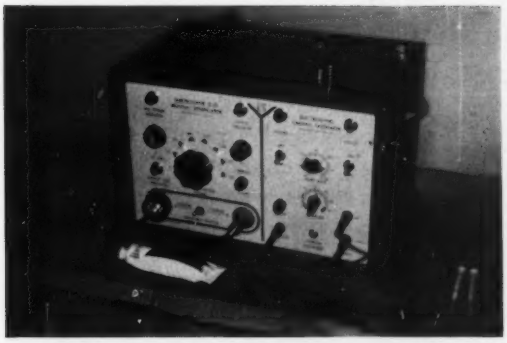

Fig. 2—Combination cardiac defibrillating machine and cardiac monitor. Offset external defibrillating electrodes appear to left on table and white tube of electrode jelly in front of unit

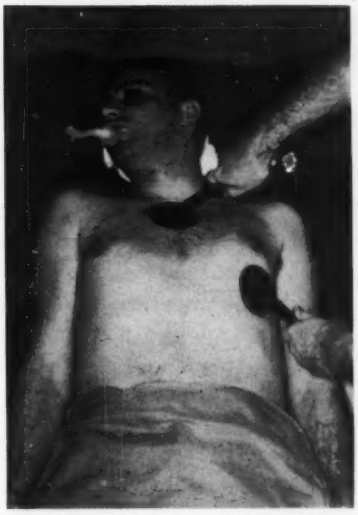

Fig. 3—Position of offset electrodes on patient's chest. Note plastic mouth-to-mouth artificial respiration tube in patient's mouth

order to bring before oral surgeons this proved, revolutionary procedure.

A report of recent exhaustive experimentation by Kouwenhoven and associates[7] has described a method of cardiac resuscitation called "external transthoracic cardiac massage." The authors present documented evidence that more immediate resuscitation after cardiac arrest can be instituted without additional equipment. The method used was mouth-to-mouth artificial respiration and intermittent hand pressure over the sternum to support circulation. The use of this technic on 20 human patients resulted in the over-all survival rate of 72 per cent.

■ *Technic*

External "cardiac massage" is accomplished by placing one's left hand over the right hand directly over the lower third of the patient's sternum (Fig. 1). If the patient is supine on a rigid surface, this pressure on the sternum compresses the heart between it and the spine, forcing out blood into the circulatory system. Lifting the hands slightly from the chest produces relaxation, allowing the heart to refill in a valvelike action. The investigators state that the unconscious or anesthetized patient's thoracic cage is surprisingly mobile, especially in a child. This method is said to be ineffective in the conscious patient.

Firm vertical pressure with the heel of the hand only, is applied approximately 60 times per minute. Sufficient pressure to move the sternum 3 to 4 cm. vertically is recommended. It must be stressed that air exchange using hand pressure alone is not adequate for respiratory requirements and must be supplemented with artificial respiration through the nose or mouth; hand action is mainly on the heart and costochondral junction and not on the pulmonary tissues.

In the adult patient, the first few pressures applied to the chest are said to loosen the costal junctions to allow adequate depression movement of this amount without fracturing the ribs. Rib fracture has been reported with the use of this method, but such fracture is a minor complication considering the reason that chest compression was instituted.

Recorded pressures of 60 to 100 mm. of mercury were recorded in human patients during external massage. Reports of being able to develop up to 150 mm. of mercury by this method have also been recorded in which systolic pressures of only 70 to 80 mm. of mercury were recorded as maximum with open-chest manual massage in the same patient. Records were made by an indwelling arterial cannula.

In the event of suspected or diagnosed ventricular fibrillation, external electronic defibrillation is necessary. To establish the diagnosis of ventricular fibrillation, electrocardioscopic equipment is needed. A 110 volt alternating current closed-chest defibrillator was used successfully in three such instances in Kouwenhoven's study, even though 400 volts is usually recommended with this unit (Fig. 2). The two offset metal electrodes are placed on the chest with electrode paste, one at the manubrium of the sternum and the other above the apex of the heart (Fig. 3).

■ *Discussion*

With this technic, various complications of thoracotomy are avoided, time is saved in beginning treatment and the surgeon is less likely to have medicolegal problems later. It is believed by the authors that this procedure will dominate future cardiac resuscitation. It will be interesting to observe whether following studies of this technic find as high a survival rate. The survival rate of 72 per cent of patients after closed-chest cardiac massage is in striking contrast to the survival rate of 29 per cent of patients after open-chest cardiac resuscitation.[8] This latter figure also represents a permanent survival rate and does not include instances in which resuscitation was accomplished but the patient subsequently died. Addi-

tional advantages of the closed-chest method of cardiac resuscitation are that it is easily learned and requires little or no equipment.

If results of later studies of closed-chest cardiac massage are favorable, we may well have passed into a new era of treatment for cardiac emergencies.

■ *Summary*

A new method for the treatment of cardiac arrest has been reviewed. It is a highly effective, closed-chest method of cardiac massage that has been carefully tested and has been found to be sound. It is believed that this procedure will eventually dominate future cardiac resuscitation.

This article contains a portion of the material submitted as a partial requirement for a Master of Science degree from the State University of Iowa.

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■ Laryngeal Tuberculosis

The occurrence of laryngeal tuberculosis had been of grave prognostic significance prior to the days of antibiotic therapy. Now, due to the excellent response to antibiotics, laryngeal tuberculosis is merely a complication although it usually indicates a more severe variety of pulmonary tuberculosis, with breakdown of host resistance. . . . The treatment of laryngeal tuberculosis is essentially that of the parent condition, namely, pulmonary tuberculosis. . . . Healing is brought about in a great majority of cases in about 4 months but treatment is continued for at least one year and is stopped only if the pulmonary status is satisfactory. Effective drugs presently used are streptomycin, dihydrostreptomycin, isoniazid and PAS. *L. M. Arnold, Management of Tuberculosis of the Larynx, Journal of the Mount Sinai Hospital, July-August 1956.*

Dissection of labial frenum: a new technic

■ *Antonio Kokic R.,* D.D.S., and*
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Since a low insertion of the superior labial frenum may interfere with proper function of a maxillary prosthesis, it should be corrected prior to construction of a denture.

A simple surgical technic for labial frenectomy is described. Advantages of this method include reduction in postoperative bleeding and hematoma formation and more rapid healing.

A very low insertion of the labial frenum frequently creates a difficult prosthetic problem for the dentist in obtaining a perfect peripheral seal for the upper complete denture.

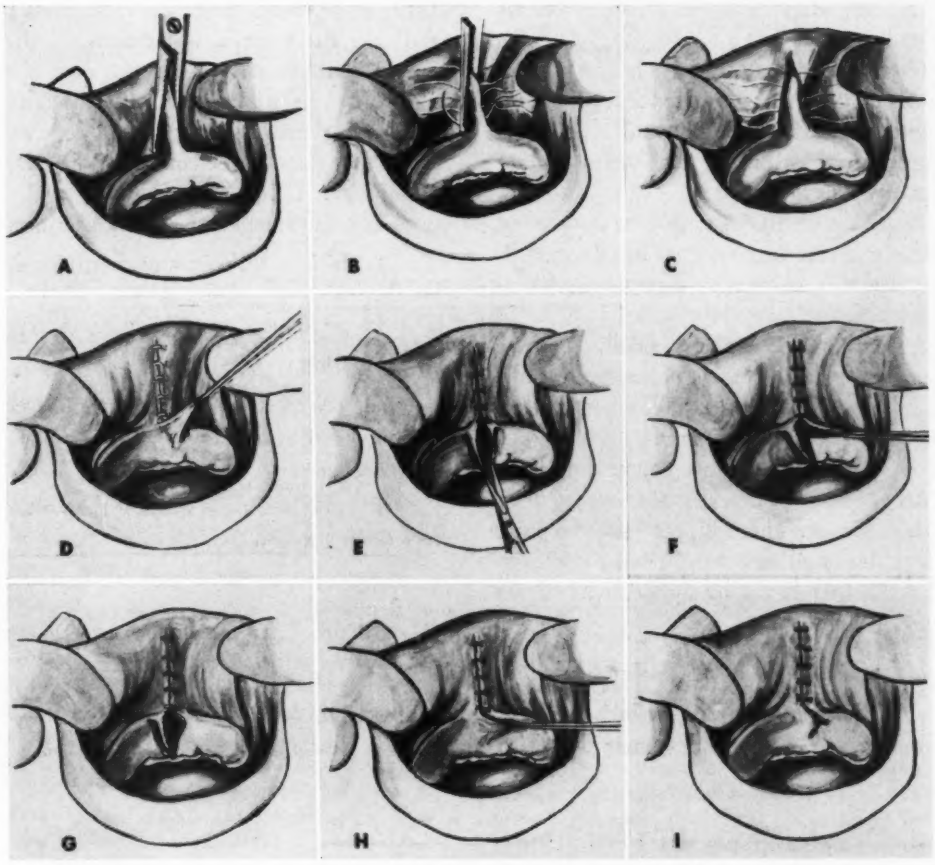
The solution in these instances, as all dentists know, is the frenectomy, but the most frequently employed technics generally are not the best for the average dentist to perform because of abundant hemorrhage requiring ligation of smaller vessels as well as the postoperative complications of edema and hematoma.

To solve this problem, we have developed a surgical technic in our prepros-thetic surgery department that we believe to be original as it has not been found described in dental literature.

■ *Surgical Technic*

As in every intraoral operation, the patient must not have any disease which would lessen his normal defense mechanisms. A dental examination is made and any laboratory tests indicated from the history are ordered. A hypnotic, usually pentobarbital sodium, 1 grain, is administered to nervous patients a half hour before the operative procedure.

A local anesthetic is infiltrated through the vestibular sulcus at the pyriform fossa in order to obtain some local ischemia, at the same time avoiding the edema and masking the frenum after direct injection into the region. After anesthesia has been obtained the assistant grasps the lip in the midline and draws it up so that the insertion of the frenum is projected. The beaks of a Kocher clamp are closed over the entire extent of the labial insertion of the frenum (illustra-



tion, A). Sutures are placed through the mucous membrane approximately 1 mm. above the clamp, their number varying between four and six and separated by a distance of 2 mm. This is done before removing the Kocher clamp to avoid the possibility that the lips of the wound may open and bleed (illustration, B). The clamp is removed and the tissue is sectioned with the scissors following the ischemic track left by the jaws of the clamp (illustration, C). The sutures are tied and the first part of the operation is completed.

The sectioned frenum remains attached by its gingival insertion. It is with this tissue that a plastic procedure is performed to cover the exposed gingival raw surface and thereby shorten the time required for healing. If at this time the sectioned frenum is grasped by its free end with a tissue forceps, it takes on a pyramidal shape with two lateral faces left and right and an upper surface which corresponds to the raw sectioned surface (illustration, D). One of the lateral faces is then freed from its submucous tissue

and the other face is removed completely with the connective tissue and muscular fibers (illustration, E, F, G). The mucous flap is cut so that it will cover the bleeding gingival surface exactly and is fastened in place with one or two sutures (illustration, H, I).

This technic is employed only when the gingival insertion of the frenum is wide. If a narrow or linear insertion is present, the procedure is not justified as the raw surface is very small. In these instances sectioning is performed with a scalpel and hemostasis is obtained by electrocoagulation or cautery.

The postoperative course has been uneventful in every patient treated in this manner. There is practically no pain, and the small amount of edema is treated in the first hours by applications of ice and then heat.

■ *Summary and Conclusions*

The frenectomy described herein is different from those previously described because the labial insertion is sectioned, not over the forceps, but exactly in the ischemic track left on removal of the clamp and by eliminating only a part of the gingival insertion. The remaining raw gingival surface can be covered by mucous membrane.

The advantages of the technic are:

1. It is a technic any dentist may employ.

2. There is no hemorrhage during the operation.

3. The postoperative course is never accompanied by hematoma and the edema is negligible.

4. The healing is quicker than after any other method.—*Casilla* 286.

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■ Rewards of Work

The religious precept that you must lose yourself to find yourself is no less true at the secular level. No one who has observed the devoted scientist in his laboratory can doubt the spiritual rewards of such work. The same is true of anyone who is working toward goals that represent the highest values in his society. *Life Magazine. The National Purpose. John W. Gardner. Chicago Daily News June 25, 1959.*

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CASE REPORTS

Intradermal nevus in the oral cavity evidently developing into a primary melanoma: *report of case*

■ *Victorino G. Villa,* D.D.S., M.S.D., and Jaime E. Laico,† M.D., Manila, Philippines*

Most melanomas are derived from nevi or moles. There are four types of nevi; namely, (1) junctional, (2) intradermal, (3) compound and (4) blue.[1] It is believed that the compound or dermal-epidermal type is more prone to develop into melanoma than the other types.[2] It is also said that primary melanoma in the oral cavity is rare; in the majority of instances the lesions are secondary or metastatic.[3] Greene and co-workers[4] consider the presence of intraepidermal (junctional) activity in the lesion as one of the criteria in establishing diagnosis of a primary melanoma in the oral cavity.

The case being reported in this article is an intradermal nevus in the oral cavity, evidently developing into a primary melanoma.

REPORT OF CASE—A married woman 26 years old was seen with pigmented areas in the mucosa of the right posterior region of the maxilla both on the lingual side and on the buccal side. The pigmentation on the lingual side had been observed by her parent since early childhood; hence, it was regarded as a "birthmark" mole. The pigmentation was smooth and not elevated.

The pigmentation on the buccal side was first noticed when the patient was 15 years old. It started as a small pigmented area and gradually increased in size until it extended from the region of the second molar to the region of the second bicuspid and from the free gingiva upward to the alveolar mucosa. Unlike the lingual pigmentation, which was brownish in color, the buccal pigmentation appeared dark gray. It was elevated from the rest of the normal mucosa and was rough in texture. During toothbrushing, the buccal lesion often had been traumatized and slight bleeding had occurred. The patient complained of excessive salivation and of her saliva's becoming yellowish in color. Brownish pigmentation also was observed in the mucosa in the tuberosity region. Like the lingual pigmentation, the pigmented area was smooth and not elevated as in the buccal mucosa.

A plaster cast model (Fig. 1) was made of the maxilla of the patient. It may be noted that the right posterior region of the maxilla was greater in size than the left posterior region.

The patient was referred to a physician for a physical examination. No evidence of any primary site of melanoma in other parts of the

Fig. 1—Plaster cast of maxilla of patient. Note that right posterior region (indicated by opposing arrows) is much larger than left posterior region

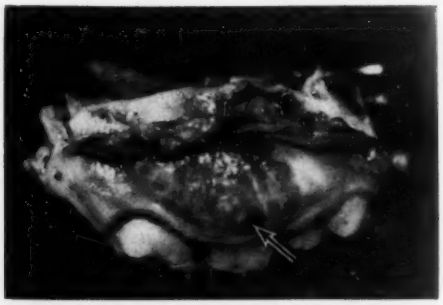


Fig. 2—Surgical specimen. Note elevated structures in pigmented area of buccal mucosa. Small dark areas shown by arrow are indicative of some necrotic changes of epithelium

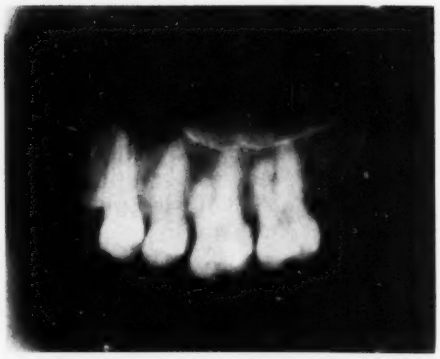


Fig. 3—Roentgenogram of surgical specimen. No definite osteolytic changes in alveolar bone nor resorption of teeth could be observed

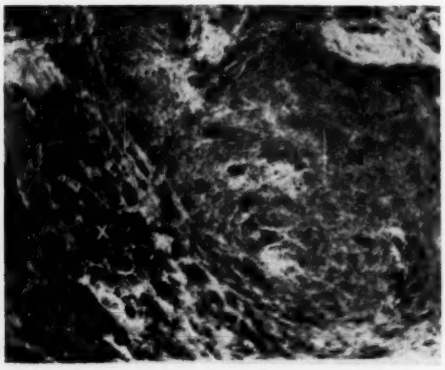


Fig. 4—Buccolingual section showing mass of nevus cells (N) in palatal mucosa. Note cells in portion at left (X) which are heavily loaded with melanin pigments. This mass is located far from epithelial layer. (Heidenhain stain)

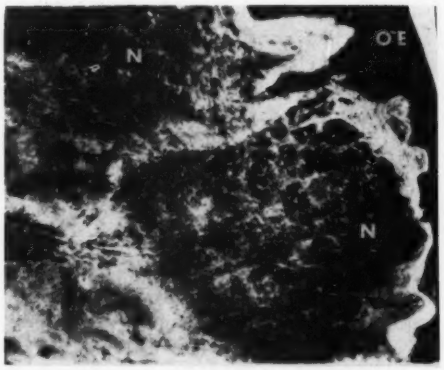


Fig. 5—Buccolingual section showing masses of nevus cells (N) in buccal mucosa, evidently pressing on oral epithelium (OE). Note epithelium undergoing atrophic changes as evidenced by its thickness and disappearance of characteristic epithelial pegs in attached gingiva. (Heidenhain stain)

Fig. 6—High power view of buccal mucosa showing mass of nevus cells. Epithelium has been detached from mass, and nevus cells indicated by arrows appear pleomorphic. Other cells are heavily loaded with melanin pigment. (Hematoxylin-eosin stain)

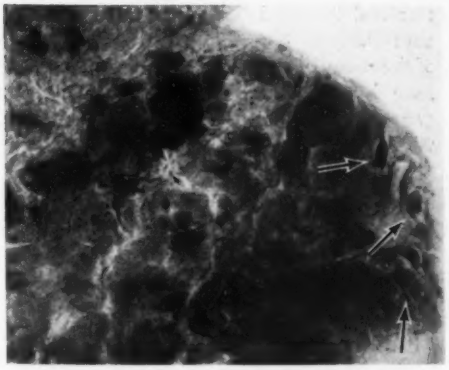


Fig. 7—Buccal mucosa at region of junction of attached gingiva and alveolar mucosa of cheek. Note masses of nevus cells (N) and fragile oral epithelium (OE) indicative of atrophic and necrotic changes. Arrow points to mass of nevus cells in region of alveolar mucosa. Some cells are heavily loaded with melanin pigments. (Heidenhain stain)

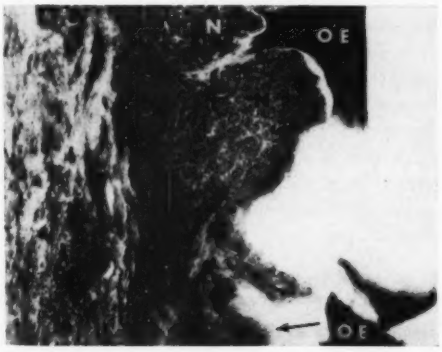
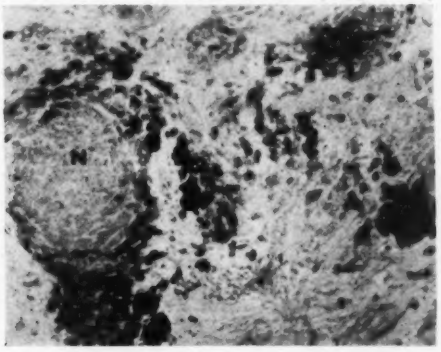


Fig. 8—Mesiodistal section of tuberosity of maxilla showing nevus cells scattered over area loaded with melanin pigment. Note nest of nevus cells (N). Nevus cells are not in contact with epithelial layer of mucosa. (Hematoxylin-eosin stain)



body was observed. A biopsy specimen of the buccal lesion was taken and the biopsy report was "compound nevus" with "no sign of malignancy." In spite of the biopsy report, it was finally decided to remove in toto the right posterior region of the maxilla. The size and unusual location of the nevus caused it to be easily traumatized during toothbrushing. The right posterior region of the maxilla was evidently increasing in size. The appearance of the lesion, which was dark gray, rough in texture and lobulated, seemed to indicate malignant changes. The yellowish-brown coloration of the saliva complained of by the patient might have been due to the presence of melanin granules or nevus cells containing melanin which might have escaped into the oral cavity through some minute necrotic area or ulcer, particularly in the buccal lesion. We were also aware that melanomas are very malignant neoplasms that metastasize earlier than most malignant growths.

Figure 2 shows the surgical specimen that was sent to the laboratory for histologic section. The roughness of the buccal lesion appears to have been due to small elevated structures on the mucosa. Small, dark spots associated with these elevated structures, one of which is indicated by an arrow, were present. They seemed to indicate necrotic areas in the epithelium. The specimen was decalcified, embedded in celloidin and later sectioned buccolingually in the region of the second bicuspid and the first molar, and mesiodistally from the region of the second molar to the tuberosity of the maxilla. Some of the sections were stained with hematoxylin-eosin and others, with Heidenhain's iron hematoxylin stain.

The roentgenogram of the surgical specimen prior to fixation and decalcification showed no definite osteolytic changes in the bone nor resorption of the teeth (Fig. 3). The nondevelopment of the third molar is evident.

MICROSCOPIC FINDINGS—A buccolingual section in the region of the first molar showed masses of nevus cells in the lingual mucosa (Fig. 4). In the portion marked X, the cells were heavily loaded with melanin pigment. In the lingual mucosa, the masses of nevus cells were located rather far from the epithelial layer. In all sections examined, the normal arrangement of the epithelial pegs and the connective tissue papillae of the lamina propria were not disturbed. This one observation led us to believe that the nevus under consideration was the intradermal type.

In the buccal mucosa (Fig. 5), the masses of nevus cells were close and, in some areas, in contact with the epithelial layer. They evidently were pressing upon the epithelial layer causing atrophic changes of the epithelium. The thickness of the epithelium was much reduced and, in some places, the epithelium was devoid of the characteristic epithelial pegs in the attached gingiva. The outline of the epithelial cells was no longer discernible in some areas, either with hematoxylin-eosin or Heidenhain staining. We considered this condition as another evidence that we were dealing with a nevus of the intradermal type.

Figure 6 illustrates an area in the buccal mucosa showing in higher magnification a mass of nevus cells devoid of epithelial covering. The atrophic epithelium has been detached from the underlying tissue. The nevus cells indicated by arrows appeared pleomorphic. Some of the cells were heavily loaded with melanin pigment. At the junction of the attached gingiva and the alveolar mucosa of the cheek (Fig. 7), the epithelial layer appeared rather fragile or already necrotic and was easily detached from the advancing masses of nevus cells. A portion of the alveolar mucosa already had been invaded by the nevus cells, as indicated by an arrow in the illustration. Some of the cells in this region also were loaded with melanin pigment.

In the mesiodistal section of the tuberosity of the maxilla (Fig. 8), masses of nevus cells also were present. A nest of nevus cells could be noted, and some cells, evidently arising from this nest, were loaded with melanin pigment. As in the palatal mucosa, the masses of nevus cells were not in contact with the epithelial layer.

COMMENT—It is difficult to determine whether or not the nevus cells in the buccal mucosa were derived from the nevus cells of

the lingual mucosa or from the "birthmark" mole. If they were, the extension of the nevus cells from the lingual region to the buccal region could hardly be through infiltration of the bone. As shown in Figure 3, there appeared to be no definite osteolytic changes nor resorption of the teeth. It seems likely that the extension was via the mucosa of the tuberosity region. The evidently rapid proliferation of the nevus cells in the buccal region may be attributed to their constant exposure to irritation, particularly during toothbrushing.

There seems to be no doubt that the present case of nevus in the oral cavity is of the intradermal type. We did not observe the typical histologic picture of a compound nevus. Neither did we observe proliferative changes in the cells of the oral epithelium nor intraepidermal activities in all pigmented areas. On the contrary, we found that the epithelial cells in the buccal lesion were undergoing atrophic and degenerative changes leading to eventual necrosis. Even though the decalcified specimen was embedded in celloidin, the atrophic epithelial layer was easily detached from the advancing masses of nevus cells. We believe that, if it had not already happened, extensive ulceration in the buccal lesion would occur eventually, thus exposing the masses of nevus cells to all kinds of irritation in the oral cavity.

We were unable to observe definite mitotic figures. The presence of melanin renders the detection of mitotic figures difficult. However, we believe that it is an open question whether or not the present case can be regarded as a primary melanoma in the oral cavity. There seems to be no doubt that the nevus cells were pleomorphic and proliferating to the extent of causing necrosis of certain areas of the buccal mucosa due to pressure. Because melanoma is a very malignant form of neoplasm that metastasizes early, it seems to us that the surgical management of the case was timely. The clinical and histological findings appear to support that view.

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■ INNER LIFE

What lies behind us and what lies before us are tiny matters compared to what lies within us.—*William Morrow.*

Sublingual cyst: *an unusual report of case*

■ *Richard J. Burch,* D.D.S., Tucson, Ariz.*

A 20 year old white airman was referred on July 2, 1959 for diagnosis and treatment of a mass in the floor of the mouth.

HISTORY—The patient stated that for the past five years he had noticed a mass which gradually increased in size. In the beginning it had been neither tender nor painful. However, for the past two years or more, the swelling had increased more rapidly and at times considerable swelling on the left side of the neck was associated with meals. Some relief was obtained by massage and on several occasions, the patient stated, small stones had been expressed from Wharton's duct during massage. This procedure never completely resolved the mass, and at the time that the patient was seen, he complained of interference with, and elevation of, the tongue.

PHYSICAL EXAMINATION—Complete examination of the patient revealed no other contributory physical findings besides the mass. This mass occupied the entire submaxillary region from the symphysis of the mandible to the hyoid bone and the base of the tongue (Fig. 1, left). The mass was firm but neither hard nor tender, movable, not fixed to the skin, and outlined fairly easily by palpation. The oral sublingual mucosa was normal in color and tone, and no evidence useful for diagnosis was apparent in the mouth (Fig. 1, right). The

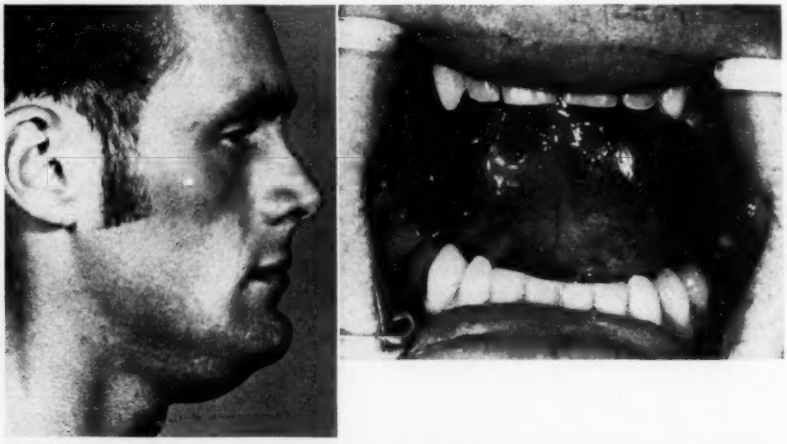

Fig. 1—Left: Lateral view of mass in submandibular area. Right: Sublingual mucosa

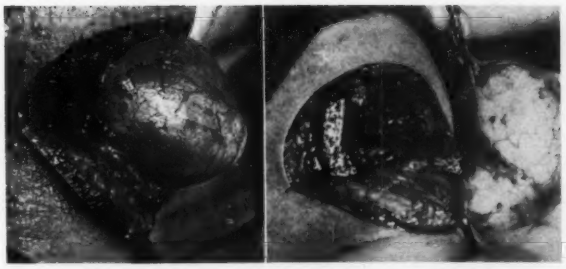

Fig. 2—Left: Extrusion of cyst because of pressure of enveloping tissues. Right: Cyst completely removed

submaxillary glands were palpable and functioning, and they seemed to be normal in size.

LABORATORY AND ROENTGENOGRAPHIC DATA—The results of laboratory and roentgenographic examination were within normal limits, and no evidence of salivary calculus was found. No evidence contributory to the diagnosis was found in the roentgenograms.

On July 8, under local anesthesia, a stab incision was made through the skin at the submandibular midline, a 15 gauge needle was inserted in the mass, and the plunger of the attached syringe was withdrawn. This produced an intruded lumen-sized rod-like specimen of caseous material similar to that found in sebaceous cysts. Laboratory analysis was noncontributory. The regional skin was examined again for signs of the origin of a sebaceous cyst but no evidence was found.

OPERATION—On July 15, the patient was operated on under nasotracheal general anesthesia. A 15 cm. parabolic incision below and parallel to the mandible was made through the skin and platysma. The left anterior digastric muscle was divided after isolation and the right, retracted. Then the mylohyoid muscle was divided to expose the geniohyoid muscles. The mass could be palpated, but it was not visualized until the geniohyoid had been divided. Blunt and sharp scissor dissection completed the enucleation in toto of an encapsulated mass measuring 8.5 by 6 by 5 cm. (Fig. 2). The musculature was repaired with no. 000 chromic gut and the skin, with no. 000 silk without drain. The mass was found to lie between the geniohyoid and the genioglossus muscles. No major structures were encountered; however, the major vessels of the neck were readily palpable at the base and lateral sides of the cavity. Postoperative edema was mild and the patient made an uneventful recovery.

PATHOLOGIST'S REPORT—The histopathological report gave the diagnosis of cyst, type undetermined with the following comment: "The presence of stratified squamous epithelium demonstrating a granular cell layer lining the cystic structure, suggests that this either represents an embryologic inclusion of epithelium which has become cystic or represents a fissural or fusion plane cyst."—523 *North Tucson Boulevard.*

The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Department of the Air Force or the Air Service at large.

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Multilocular median developmental cyst of the mandible: *report of case*

■ *Fred J. Lucchesi,* D.D.S., and David S. Topazian,†*
D.D.S., M.Sc. (Dent.), Philadelphia

Median developmental cysts of the jaws are seen with relative infrequency in the mandible. Olech[1] reported two cases and mentioned that a thorough search of the literature failed to uncover a single reported case of a median mandibular cyst.

Meyer[2] reported a case of median developmental cyst of the mandible and he stressed the uncomplicated course and favorable prognosis after the complete enucleation of these developmental lesions.

The origin of median developmental cysts of the mandible is generally thought to be the result of activity of epithelial remnants enclaved in the median mandibular fissure during the fusion of the bilateral mandibular arches. Stones[3] theorized that developmental cysts in the mandible might have their origin in a supernumerary enamel organ and might be of the primordial type.

Robinson,[4] supporting this theory, mentions the fact that, since the bones uniting in the mandibular symphysis have their origin deep within mesenchyme, there is no possibility for the inclusion of epithelial rests other than those of a supernumerary enamel organ.

All of the median developmental cysts of the mandible described in the literature presented a unilocular appearance roentgenographically.

HISTORY AND EXAMINATION—A 41 year old white policeman was admitted to Philadelphia General Hospital on June 23, 1959, with the chief complaint of a cyst in his lower jaw that was discovered on routine intraoral roentgenographic examination by his dentist. The lesion was entirely asymptomatic, and the only significant history was that of trauma to the anterior part of the mandible one year prior to admission, when the patient had been involved in an automobile accident.

The extraoral examination revealed no positive findings. Intraorally, all teeth except the maxillary left third molar and the mandibular first molar were present and in good condition. A hard, nontender expansion of the lingual cortical plate was palpated in the mandibular left cuspid region. No expansion of the labial cortical plate was noted. The teeth involved in the cyst reacted normally to thermal stimuli and to the electrical pulp tester. There was no evidence of dental caries or severe periodontal disease.

The impression from clinical and roentgenographic examinations was: multilocular cyst of the midline of the mandible extending laterally to the left second bicuspid and to the right cuspid (Fig. 1).

The remainder of the history and physical examination was noncontributory, and the patient was judged to be a good surgical and general anesthetic risk.

LABORATORY FINDINGS — The complete blood count, fasting blood sugar, blood urea nitrogen, serology and urinalysis were within normal limits.

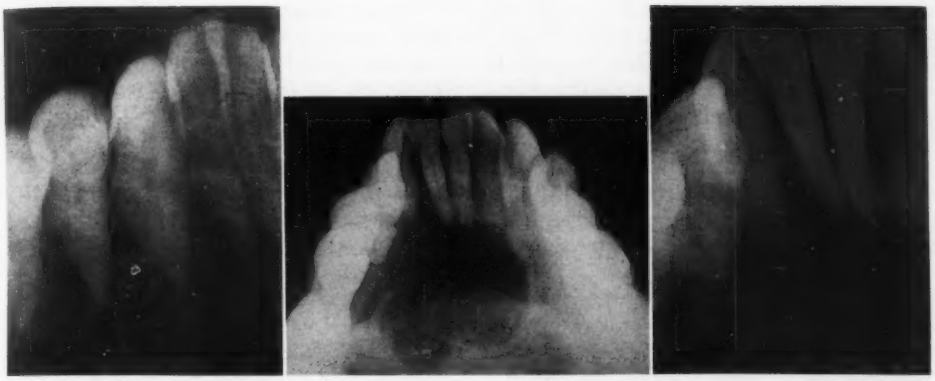

Fig. 1—Views of anterior part of mandible June 23, 1959. Note multilocular appearance of cyst and extension from left second bicuspid to right cuspid

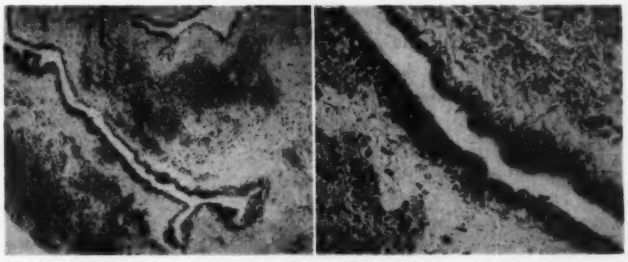

Fig. 2—Left: Low power view of cyst wall. Right: High power view of convolutions of cyst wall showing variations in well-differentiated epithelium, areas of focal hemorrhage and sparse inflammatory cell infiltration

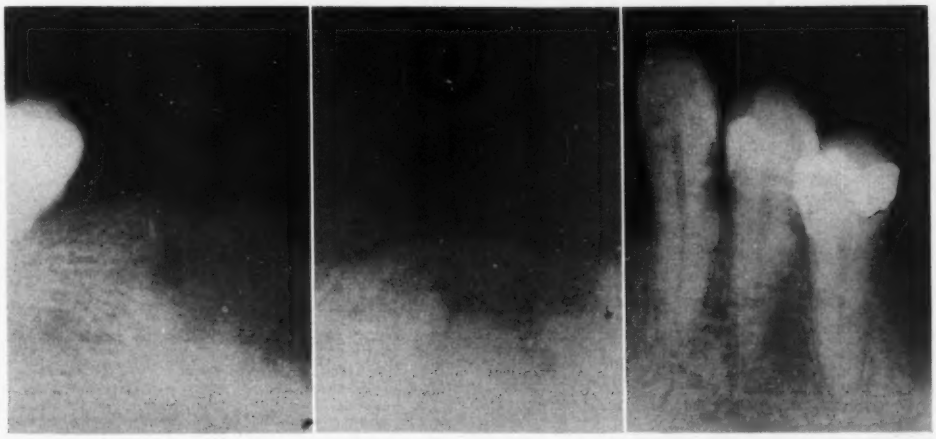

Fig. 3—Postoperative views of anterior part of mandible July 7, 1960, showing thinning of alveolar process, bone regeneration, and no evidence of extension of cystic process

TREATMENT—Under anesthesia induced with nasoendotracheal nitrous oxide, oxygen and intravenous thiopental sodium, the patient was prepared and draped in the usual manner and the pharynx walled off with damp gauze sponges.

A mucoperiosteal flap was elevated from the mandibular right first molar to the left second molar, across the gingival papillae, and the cystic area was noted beneath the thinned labial cortical plate.

The cyst was exposed by removing bone with mallet and chisel and rongeur forceps; it extended from the right cuspid to the left second bicuspid. In order to insure complete removal of the cyst, and because of the loss of alveolar bone support, the right central incisor and the left central and lateral incisors, cuspid and first bicuspid were removed.

The cyst, which contained a small amount of clear fluid, was completely enucleated. Three small perforations of the lingual cortical plate were noted. The bone ends were filed and the cavity was irrigated and cauterized with phenol followed by alcohol in a number of areas where the cyst wall had been adherent.

The cavity was packed with 1 inch gauze impregnated with bismuth-iodoform-petrolatum paste, and the soft tissues were approximated with no. 000 black silk sutures.

The patient was sent to the recovery ward having tolerated the procedure well, and having received 700 cc. of 5 per cent dextrose in water.

PATHOLOGY REPORT—The gross specimen consisted of five teeth. A cystic structure 3 cm. long with tough tan-gray walls was adherent to the apex of one tooth.

Microscopic examination showed that the cyst was lined with well-differentiated squamous epithelium which followed the many folds and invaginations (Fig. 2). Also present was a granulomatous mass in which there were numerous cholesterol clefts and many foreign body giant cells. The stroma contained extravasated red blood cells and collections of plasma cells.

The diagnosis was: median developmental cyst.

POSTOPERATIVE COURSE—In the immediate postoperative period, the patient had a minimum of soreness and swelling. Paresthesia of the left side of the lower lip was noted. He was discharged from the hospital on the third postoperative day.

The packing was gradually removed and replaced, and fairly complete filling in of the cavity was evident by November 1959. Sensation had returned to normal in the left lower lip.

The right lateral incisor and the left second bicuspid were removed in April 1960, because of mobility and tipping. A partial denture is being worn successfully by the patient.

Roentgenographic examination on July 7, 1960, showed thinning of the alveolus with bone regeneration and no evidence of extension of the cystic process (Fig. 3).

SUMMARY AND CONCLUSIONS—Median developmental cysts of the mandible are rare cysts of obscure origin. Some authors consider them to be of the primordial type, arising in the enamel organ of a supernumerary tooth.

It is advisable to retain the teeth involved in such cysts, since they will often remain vital even though the blood and nerve supply are evidently destroyed at the time of surgery.[2]

In the case reported, the cyst presented an unusual multilocular appearance roentgenographically. Although the teeth involved in the cyst were vital and were not affected by caries or severe periodontal disease, they were removed because of the extent to which the cystic process had involved the alveolar process, and because of the adherence of the cyst to the roots.—*1429 South Broad Street.*

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†Senior resident in oral surgery, Philadelphia General Hospital.

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Cheilitis glandularis: *report of case*

■ *Ray R. Rhymes, Jr.,* D.D.S.; Ronald H. Krantz,* D.D.S., and Dewey M. Metts, Jr.,* D.D.S., Shreveport, La.*

Two unrelated Negro female children, ages 5 and 11, have been seen recently at the Confederate Memorial Medical Center, department of oral surgery, with identical oral lesions that were tentatively diagnosed as cheilitis glandularis.

In both instances the mucous membrane of the lower lip first showed a single cluster of small, discrete, gray-white lesions which on initial examination was thought to be Fordyces' disease (ectopic sebaceous glands). In the seven to nine months which have followed, the entire mucous membrane of the lower lip as well as part of the upper lip and gingival sulcus have become involved with similar multiple, macular, granular-feeling, avascular lesions which seem to be enlarging. The lesions now range in size from .5 to 2 mm. in diameter, as some of the lesions have begun to coalesce (see illustration).

These lesions are completely asymptomatic. There is no swelling, crusting, odor, or discharge. Both children are well developed with no known allergies, diseases, illnesses, or other forms of pathology.

DISCUSSION—Miller[1] states that "this condition is due to the presence of aberrant mucous glands over the lips as a prenatal abnormality. The lips become swollen and studded with small nodules and a mucous secretion eruding from the glandular orifices." He also states that "this glandular activity may be inhibited by x-ray and also advocated palliative lotions or wet dressings for symptomatic relief for cases which ulcerate or show cracking of the lips."

Mead[2] believes the following to be pertinent to this particular disease entity: "This is a chronic disorder of the lips, characterized by edema and swelling with hypertrophy of the mucous glands and dilatation of the glandular openings. It was first described by Volkman in 1870.

"There is a thickening and edematous condition of one or both lips with hypertrophy of the mucous glands and enlargement of the ducts. These enlarged glands can be palpated as nodular masses and the orifices are so distinctly dilated that the passage of the probe is easily accomplished. The lip is covered with a glistening secretion which increases in amount upon pressure. There is usually some crusting and abscess formation may occur. There is generally an associated catarrhal inflammation of the buccal and pharyngeal mucosa.

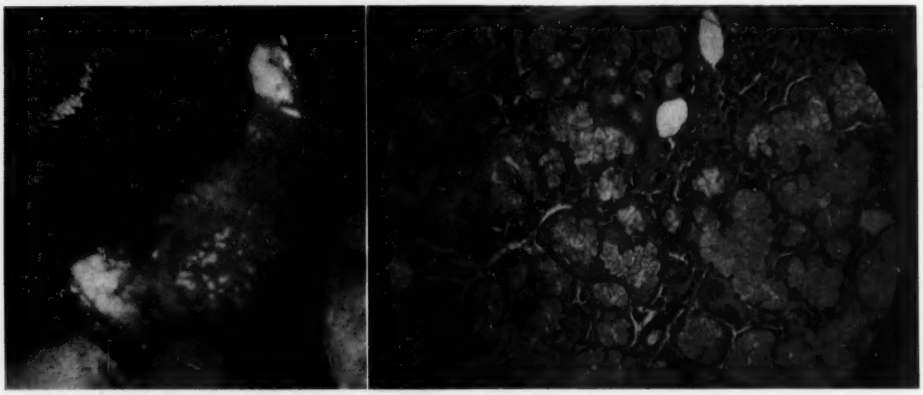
"It does not respond easily to treatment, but x-ray therapy or potassium iodide, internally, have been reported to be efficacious.

"The exact etiology is unknown."

Bernier[3] states: "This reaction may occur when tissue in the lip becomes sensitized. Fruit juices and condiments are of particular importance.

"The multiple orifices of the superior and inferior labial glands become plugged with a sticky material which may result in their elevation to form rounded 'humps.' Accumulation of the tissue fluid comes about as an angioneurotic edema and is related to tissue sensitization with increase in vessel permeability.

"This may also occur in absence of the allergic phenomenon and as the ducts become



Clinical and microscopic views of cheilitis glandularis. Note gray-white raised lesions on lower lip which have granular appearance. In microscopic view the mucous glands are seen to dominate entire field

plugged and swelling begins, localized infection may result."

Sutton[4] has obtained satisfactory results by excision of the individual lesions by means of a small cutaneous punch, as the wounds heal without scarring.

Prinz and Greenbaum[5] obtained a cure of this entity by use of 70 per cent alcohol applications at frequent intervals and daily application of 1 per cent tincture of iodine.

CONCLUSION—It seems to be generally agreed that this disease is a benign chronic inflammation of the labial glands. Slightly different clinical pictures may be seen in that some may proceed further into ulceration and abscess formation requiring palliative treatment (ointment, wet dressing, and so on).

Otherwise, it seems that simple excision, elimination of possible allergenic causes, or local treatment with alcohol and iodine will suffice.

Some cases have responded to potassium iodide. Roentgenotherapy may also be instituted.

Therefore, the main problem in this disease entity is its recognition and preventing undue alarm to the patient especially those tending toward cancerphobia and no active treatment is necessarily indicated.

*Department of oral surgery, Confederate Memorial Medical Center.

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■ EDUCATION

We need education in the obvious more than investigation in the obscure.—*Oliver Wendell Holmes.*

Ameloblastoma of the mandible followed by resection and prosthetic repair: *report of case*

■ *Duni C. Miglani,* D.D.S., M.S.D., Madras, India*

Diversity of opinion exists as to the treatment of patients with so called "benign" tumors of odontogenic apparatus (ameloblastomas).[1-3] The conservative school believes in treating such patients with curettement, surgical diathermy, cauterization with drugs, and radiation therapy, and considers resection in spite of all precautions, as a grave operation. As against the conservative school of thought, the radical group believes that these locally recurrent ameloblastomas always should be radically resected. Calvin advocates the radical operation, but recommends saving the continuity of bone, leaving the lower border of the mandible to maintain contour of the jaw.

Byars and Sarnat,[4] although they consider curettement, cauterization with drugs and radiation as inadequate therapeutic measures, suggest that the lesions should be completely enucleated if unilocular and cauterized by heat if not too large and multilocular. If extensive, they advise resection.

The author of the present report believes that the best results are obtained if the resection of the lesion, including a small amount of bone, is undertaken at the first procedure. If such an adequate excision is performed when the tumor is small, recurrences and repeated operations may be prevented.

REPORT OF CASE—The patient, a 31 year old Mexican woman, came to the M. D. Anderson Hospital on April 6, 1954 with the chief complaint of a tumor in the left lower jaw.

Five months before admission the patient had first noticed pain in the left side of her jaw and later some swelling behind the last lower molar. The patient thought the symptoms were associated with the erupting third molar and did not pay much attention to the discomfort. However, the upper molars kept the lesion irritated, and pain became more severe, involving the cheek, ear and the neck. Three weeks prior to her visit to the M. D. Anderson Hospital, she consulted a physician who referred her to a radiologist and later to this hospital with a diagnosis of adamantinoma.

On examination a tumor was found which was well encapsulated and involved the left side of the mandible at the level of left lower third molar and extended into the region of the retromolar trigone. The mass measured about 3 cm. in its greatest diameter and extended into the soft tissue of the cheek. The patient had considerable trismus. There were no enlarged cervical lymph nodes.

Two biopsies were negative for adamantinoma; however, on the basis of the roentgenographic appearance of the lesion it was decided to schedule the patient for partial resection of the mandible, preceded by another biopsy and frozen section. The operation was performed on April 30. An approach was first made below the angle of the jaw in order to obtain a biopsy. Frozen sections did not confirm the diagnosis of ameloblastoma, therefore the incision was closed in multiple layers. Approach was then made through the oral cavity. The mucosa of

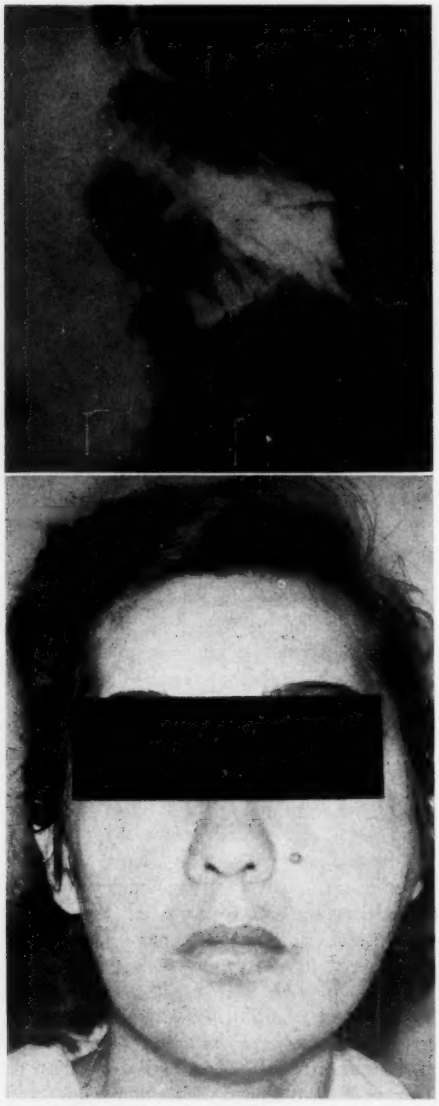

Fig. 1—Above: Roentgenogram showing radiolucent area in ascending ramus, possibly an extension of tumor (ameloblastoma). Below: View of patient showing large swelling in left condylar region

gingiva posteriorly and the ascending ramus of the mandible were incised and entrance effected into the cystic region of bone. The cystic cavity was curetted and its contents removed. The third molar tooth could be seen in the cavity but was not extracted, hoping thereby to preserve the already thinned down bony framework.

The second lower molar as well as the upper third molar were extracted. The pathologist's report of the fixed tissue specimen confirmed the diagnosis of an adamantinoma.

TREATMENT—Because of the pathologist's report, on June 3, 1955 the patient's lower third molar was extracted and the underlying mandible was curetted under endotracheal anesthesia. The frozen section report of the tissue removed was negative. The postoperative course was uneventful. The patient was followed at periodic intervals and, until her recall visit on April 26, 1957, there was no visible or palpable evidence of recurrence. There was no significant adenopathy in the neck, and the slight irregularity on the external surface of the mandible was considered to be caused by the previous surgical procedure. Roentgenograms on wet reading showed no significant changes. The patient was then given a six-month return appointment.

Final reading on the roentgenograms showed an extension of the cystic lesion which had been noted previously (Fig. 1, above).

The patient was recalled to the clinic on May 30, 1957. External swelling was present which the patient stated to have developed shortly after an episode of acute pain (Fig. 1, below). The possibility of a pathological fracture was considered. Roentgenograms were taken again and showed progressive destruction in the left side of the mandible by an expanding lesion. No definite pathological fracture was seen.

The patient was then scheduled for resection of the mandible with probable prosthetic repair. Lateral and occlusal films were taken as an aid in the preparation of the prosthetic appliance. A dental prophylaxis was given and interdental wires were placed on the teeth for later immobilization for the jaws.

Fig. 2—Acrylic internal prosthesis

OPERATION—The operation was performed on June 11 under endotracheal anesthesia. An incision was made 1½ fingers-breadth below the left ramus of the mandible, the lobe of the ear and curving along the posterior edge of the mandible, including removal of the scar of the previous biopsy. The incision was carried through the platysma muscle and a short flap developed superiorly, avoiding injury to the inframandibular branch of the facial nerve. The inferior border of the ramus of the mandible was then exposed after identifying, clamping, cutting and ligating the maxillary vessels with no. 0000 cotton. Posteriorly the tail of the parotid gland was divided to expose the angle of the mandible. Anteriorly the submaxillary gland was separated from the bone. Attachments of the masseter and the internal pterygoid muscles were severed and the ramus of the mandible separated subperiosteally from the surrounding tissue.

Dissection was carried superiorly where the cystic tumor mass was identified and accidentally entered. The attachment of the external pterygoid muscle was then severed anteriorly. The mandible was resected using a Gigli saw behind the second bicuspid region, and the horizontal ramus and angle of the mandible were then avulsed from the temporomandibular capsule and removed, leaving the cystic tumor in the coronoid process attached. The tumor was then grasped with forceps and removed with part of pterygoid muscles by scissor dissection. The tumor extended beyond the level of the zygoma. A suspicious region in the third molar region was excised and sent to the pathology laboratory for frozen section. Adamantinoma was reported to be present. A part of the mucosa was then excised in this region. The mucosa was then closed in three layers with interrupted sutures of no. 0000 chromic catgut. The wound was irrigated with neomycin solution, and the defect created by the excision of the bone was replaced by an acrylic prosthesis previously designed (Fig. 2). The prosthesis was secured to the cut edge of the horizontal ramus with a metal encasement supported by two stainless steel screws. The periosteum was sutured around the prosthesis, and the wound was closed in three layers, using a

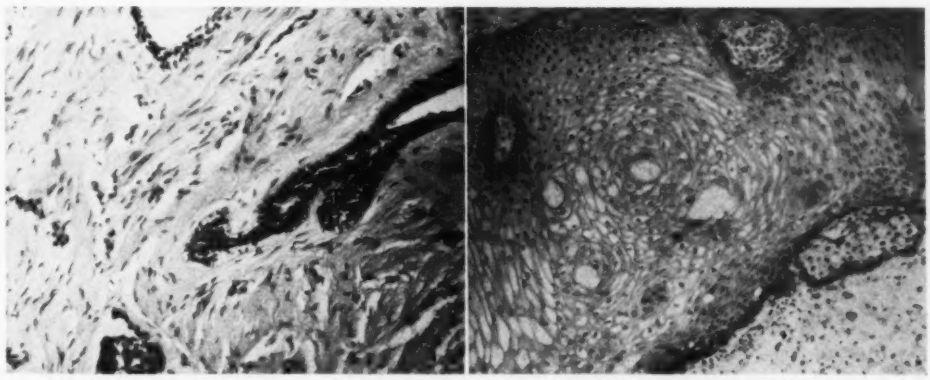

Fig. 3—Histologic examination of resected specimen

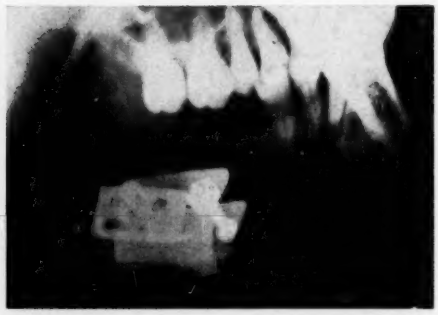

Fig. 4—Postoperative roentgenogram showing prosthesis in position

Fig. 5—Views showing cosmetic results

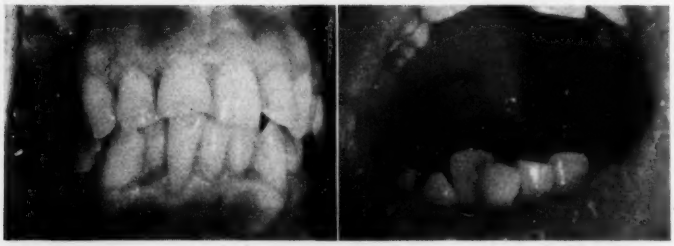

Fig. 6—Teeth are shown in good occlusion and normal range of opening of the mouth

deep layer and a platysmal layer of interrupted sutures of no. 0000 catgut and a skin layer of no. 0000 black silk. A Penrose drain was inserted from below the prosthesis and brought through a stab wound below. A tracheostomy was then performed and traction bands were placed on the teeth.

The patient tolerated the procedure well and left the operating room in good condition, having received a transfusion of 500 cc. of blood during the procedure. The final pathologist's report of the fixed specimen was adamantinoma (Fig. 3).

POSTOPERATIVE COURSE—The postoperative course was uneventful. There was good occlusion of teeth. The patient was discharged from the hospital on July 1. Rubber bands were still in position and the jaws still immobilized.

The patient returned to the hospital in three weeks, on July 22, at which time the rubber bands were removed. The region was well healed and a roentgenogram revealed the prosthesis to be in a good position (Fig. 4). Occlusion was good. The patient was instructed to use a soft food diet and to perform jaw exercises. A dental prophylaxis was given. The patient has been followed in the clinic at intervals and when last seen on June 9, 1958 she presented excellent cosmetic and functional results. The prosthesis in the region of the stump of the left side of the mandible has maintained its position and there was no evidence of recurrence. Range of movement of the mandible was satisfactory and considered normal (Fig. 5, 6).

SUMMARY—A patient was seen with ameloblastoma. The mandible was resected and a prosthesis, which had been designed previously, was inserted. This case report clearly shows that frozen section biopsy reports and wet reading roentgenographic reports may be misleading. Surgical resection is to be preferred to other more conventional conservative treatment.

*Professor and head of dental wing, Madras Medical College. Formerly, University of Texas Dental Branch and University of Texas M. D. Anderson Hospital and Tumor Institute, Houston, Texas.

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■ SIMPLICITY OF SPEECH

A vocabulary of truth and simplicity will be of service throughout life.—*Winston S. Churchill. Magazine of Books, July 12, 1959.*

Seminoma metastasizing to the oral cavity: *report of case*

■ *A. P. Chaudhry,* Ph.D.; A. R. Stoesz,† D.D.S., M.S.D., and R. A. Vickers,‡ D.D.S., Minneapolis*

Metastasis to the soft tissues of the oral cavity from malignant tumors of distant organs is a rare occurrence. Only a few cases have been reported in the literature.[1-4] We have failed to find any case of a seminoma of the testis metastasizing to the soft tissue of the oral cavity reported in the literature.

A detailed discussion on the subject of seminoma is beyond the scope of this paper. However, a few pertinent remarks about the neoplasm may be justified. Seminoma is the commonest variety of testicular tumor and comprises about one third of all neoplasms within the testis. The two most common symptoms are gradual swelling of the testes and pain. Clinical features such as extension of the tumor beyond the testis, pain, positive gonadotropin test, or presence of metastasis at the time of first examination adversely affect the prognosis.[5-6]

Microscopically, the tumor is characterized by its monocellularity. The cells are usually large, round or polygonal with ill-defined clear or slightly pink cytoplasm. The nucleus is large, centrally placed and deeply chromatic having one or more prominent nucleoli. The cells are usually arranged in large sheets or masses without any distinctive pattern or architecture. They are separated by stroma which may be scant or abundant and which varies from lymphoid to granulomatous or scirrhous in nature. Moderate to large regions of ischemic necrosis are not uncommon. Abundant lymphocytic reaction of the host tissue to tumor cells and absence of vascular invasion by the neoplasm are two histologic characteristics that are of favorable prognostic value.

The sites of metastasis from seminoma of the testis are the periaortic and iliac lymph nodes, liver, lungs, kidneys, adrenal glands, pancreas, peritoneum and pleura.

The neoplasm is extremely radiosensitive. The most accepted method of treatment is resection of the involved testis and associated cord followed by prophylactic radiation therapy to the periaortic nodes in a dose of approximately 1,000 to 1,200 r. "Even some success has been reported in treating isolated pulmonary and osseous metastasis of seminoma by radiation."[6]

REPORT OF CASE—A 57 year old white man was first admitted into the hospital on February 3, 1959 for removal of a right testicular mass. The patient stated that his right testis always had been bigger than the left one, but in the last two weeks it had grown even bigger and harder. On admission his hemoglobin was 14.5 Gm. per 100 Gm. and white blood cell count 7,250 per cm. Urinalysis showed a mild diabetic condition. The chest roentgenograms indicated pulmonary fibrosis but no enlargement of the heart. The right testis and the cord were surgically removed, and the postoperative recovery was uneventful.

The tumor mass had completely replaced

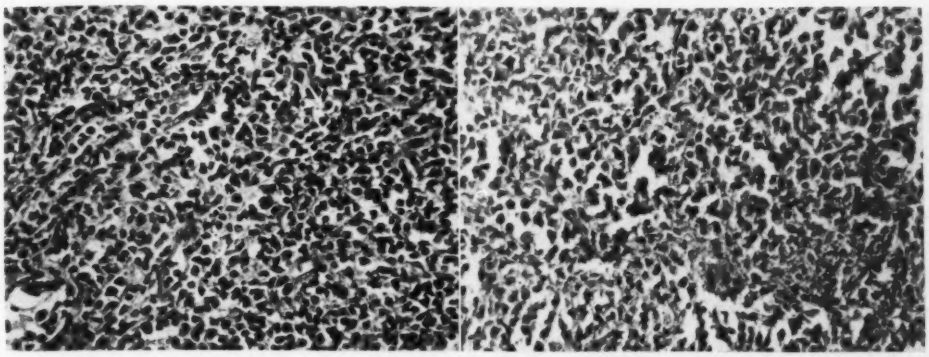

Fig. 1—Photomicrographs of right and left testes demonstrating monocellularity, moderate pleomorphism and scant stroma

the testis. It was composed of remnants of atrophic testicular tubules interspersed with extremely cellular neoplasm. The cells were poorly differentiated and exhibited pleomorphism (Fig. 1, left). The cytoplasm was clear; therefore, the cell boundaries were not well defined. The nuclei varied in size and shape and contained one or more nucleoli. The stroma was scant and fibrillar in nature. Focal areas of necrosis were present. The mitotic figures were easily noticeable. The microscopic features were compatible with malignant seminoma. In March, 1959 the patient suffered a mild coronary attack from which he recovered satisfactorily.

On August 16, 1959 he was readmitted into the hospital for resection of a left testicular mass of two weeks' duration. The mass was firm, movable and slightly tender. It had shown progressive enlargement and measured 2 by 1.5 inches.

At this admission, the routine blood count, the chest roentgenograms and urinalysis were essentially within normal limits except for a mild diabetic condition. The patient was considered to be a good surgical risk and, therefore, general anesthesia was administered and the left testicular mass was removed. This procedure involved removal of the testis and the cord. The tumor had completely replaced the tseticular tissue. Grossly, the cut surface was homogenous, pale brown and traversed by septa. Microscopically, the tumor presented features similar to the preceding section (Fig. 1, right) except for the monocellularity which was more evident. The recovery from the operation was uneventful, and the patient was discharged from the hospital.

The patient was readmitted on September 19, 1959. Three weeks prior to this entry, he started having persistent pain and progressive enlargement of the left cheek. He consulted a dentist, who prescribed penicillin, but no improvement was noted. He was referred to one of us (A.R.S.) as a private patient.

Physical examination at this time revealed a somewhat apprehensive patient with an indurated swelling involving the left cheek and submandibular region. Within the oral cavity a firmly fixed mass was noted extending from the left tonsillar region forward over the partially erupted third molar and into the cheek. Soft tissue involvement in the form of lobular swelling also was seen over the lateral and medial surfaces of the mandible as far forward as the bicuspids. The texture of the mass was firm and rubbery, and the overlying mucosa showed inflammatory changes but was otherwise intact (Fig. 2). No changes suggestive of osseous invasion were seen on either the extraoral or dental roentgenograms.

On the basis of the patient's history and the clinical picture, a tentative diagnosis of metastatic neoplasm with secondary infection

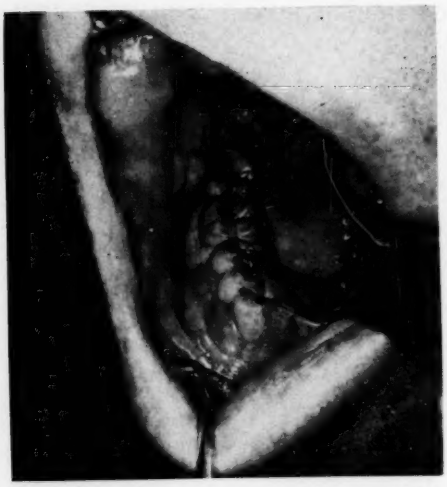

Fig. 2—Metastatic involvement of buccal parieties and alveolar mucosa

was made. Several biopsy specimens were taken from representative regions of the lesion and submitted for microscopic diagnosis. Because of differences of opinion in the microscopic interpretation of the specimen, several extra slides were prepared and sent to some outstanding oral and general pathologists. There was no unanimity of opinion; the diagnoses suggested were metastatic seminoma, lymphoma, and lympho-epithelioma in that order. Another biopsy specimen from the cheek was obtained in the hospital and the histologic features appeared more compatible with the preceding tissues from the right and left testicular tumors; therefore, definitive diagnosis of metastatic seminoma was made. The tumor was composed of pleomorphic cells interspersed with mucous glands. The cells were large with abundant clear to slightly pink staining cytoplasm. The nuclei were irregular in size and shape and their nucleoplasm appeared to be vacuolated and contained one or more nucleoli (Fig. 3). The cell masses were separated by a moderate quantity of collagenous stroma. There were scattered lymphocytes throughout the tumor mass. Areas of necrosis and mitotic figures were commonly seen.

At this admission the patient was given a thorough physical examination. The routine laboratory tests including jaw and chest roentgenograms were within normal limits. There was no evidence of regional lymph nodes or distant pulmonary metastasis. The patient was treated with 2250 r in air in nine treatments over the left cheek from September 23 through October 2, 1959. The response was very encouraging, and the tumor seemed to have disappeared.

On December 7 the patient was readmitted with a severe lumbar pain, anorexia, distention of the abdomen and a 30 pound weight loss since the removal of the left testis. The chest roentgenograms showed slight elevation of the diaphragm, increase in size of the heart and multiple bilateral pulmonary metastases. No definite destructive changes could be identified in the vertebrae. Minimal to moderate productive changes involved the mid and lower dorsal vertebrae. Palliative radiation therapy in doses of 1,200 r in air in four treatments was given over the lumbar spine.

The patient died on March 19, 1960 from the disseminated disease. No autopsy was performed.

DISCUSSION—This case report brings up several points of interest for discussion. Namely, it re-emphasizes the critical role the dental profession can play in recognizing and relating oral lesions to a distant cause. This lesion easily could have been overlooked or mistreated for infection if a good history had not been taken. In this instance the history revealed removal of bilateral seminomas of the testes. Taking of the biopsy specimen from this lesion without waste of time helped to arrive at a definitive decision and planning of the treatment.

The microscopic diagnosis of the secondary lesion in the oral cavity posed a problem because of the anaplastic nature of the cells. However, the basic pattern was similar to the tumors that had been removed from the right and left testicles. Since the primary lesion was, undoubtedly, a seminoma, the oral lesion was most likely a metastasis from it. However, out of context, the diagnosis of lymphoma (reticulum cell sarcoma) or lympho-epithelioma as was

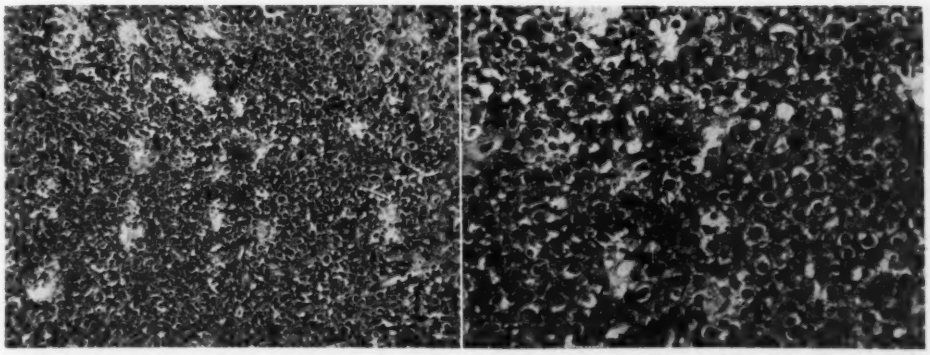

Fig. 3—Left: Photomicrograph of specimen removed from buccal parieties. Note microscopic similarity of lesion to primary tumor. Right: Higher magnification

suggested earlier, was equally justified.

Lastly, this case report illustrated that secondary carcinoma of the oral cavity can occur from any distant organ and should always be kept in mind in differential diagnosis of oral lesions.

SUMMARY—A 57 year old man was seen who had seminoma of the testis which metastasized to the buccal mucosa. The examination and treatment are described in detail. It is important for the dentist to keep in mind when making a differential diagnosis of oral lesions that secondary carcinoma of the oral cavity can occur from any distant organ.

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■ Facts

A fact is neither more certain nor more probable for being found in a great number of new authors, who have copied it one from the other.—*Abbe Fleury.*

■ Further Comparative Studies of Sodium Methohexital. G. M. Wyant and J. S. Barr. Canad. Anesth. Soc. J. 7:127 April 1960.

Methohexital sodium has been the subject of a number of studies to evaluate its suitability for clinical anesthesia. In an earlier comparative study with thiopental sodium, each drug was used on a series of healthy women for induction and maintenance of anesthesia, oxygen only being administered by mask. On the basis of that study, the conclusion was made that methohexital, as compared with thiopental, combined shorter action with greater potency. The relative potency of thiopental sodium to methohexital sodium was found to be 1 to 1.54 with a total sleep time ratio of 1 to 0.7.

In this study it was decided to use thiopental sodium or methohexital sodium for induction and supplement it with nitrous oxide-oxygen anesthesia. This is a more desirable way of using barbiturates clinically. In order to eliminate any possible prejudices because of previous studies and findings, a blind study was decided on. The authors did not find a clear relation in this study between the wake-up time and the total dose of barbiturate administered. Degree of apprehension or sedation, metabolic rate, effective premedication, age, obesity, effective nitrous oxide, and other less tangible factors must be taken into account in relating dose to sleep time so that a mere comparison affords only limited information. If any conclusion could be drawn from this comparative study it is this. If thiopental sodium 2½ per cent or methohexital sodium 1 per cent is used for induction of anesthesia and for supplementation of nitrous oxide-oxygen anesthesia for a standard operative procedure, and if both drugs are injected at the same rate, the degree of anesthesia obtained and its quality are on the average similar, except that awakening after methohexital sodium is quicker, and orientation is faster and more complete than with thiopental sodium. These may be significant factors in outpatient practice and where good recovery room facilities are not available.—*Myron Kaufman.*

■ Cartilage Pharyngoplasty in Cleft Palate Patients. Robert F. Haggerty, M.D., and Milton J. Hill, M.D. Surg., Gynec. & Obst. 112:350 March 1961.

In the cleft palate patient who has a speech difficulty, a rather short palate of limited range of motion coupled with a rather large nasopharynx is frequently found. Even after surgical repair of the cleft palate, the same characteristics often combine to prevent satisfactory speech. This study was primarily concerned with procedures designed to move the posterior pharyngeal wall forward and thus improve velopharyngeal closure. In patients whose soft palates were mobile and approached within a centimeter or a centimeter and a half of the posterior pharyngeal wall during speech sound production, it was decided to introduce viable cartilage graft.

Viable homogenous cartilage stored in air and sterile containers at 3° to 5°C. was selected for this study after evaluation of several methods of storage and preparation.

The cartilage grafts were introduced behind the posterior pharyngeal wall through a transoral approach, under general anesthesia. Care was taken to place the cartilage in a position sufficiently superior to permit velar contact.

Preoperative and postoperative speech recordings, roentgenograms, and audiometric

studies of the first 20 subjects operated on in this manner were carefully studied. Of these 20 subjects, two had autogenous cartilage grafts, the remainder had viable homogenous cartilage grafts. One of these two showed partial resorption. In the viable homogenous cartilage the authors expect a slow replacement by fibrous tissue with resultant loss of bulk in the posterior pharyngeal wall. This was seen in several instances but speech loss did not appear to be directly proportionate. The individuals in the group who were judged to have improved in each of the four rated aspects of speech were as follows: 15 to have increased intelligibility, improved articulation and less hypernasality, and 13 were judged to have less audible nasal emission of air during speech. During the subsequent 11 months, other individuals in the group improved sufficiently so that one year after pharyngoplasty 18 were judged to be more intelligible, and 16 to have better articulation, 17 less hypernasality, and 17 less nasal emission. The results of this study indicate the forward displacement of the posterior pharyngeal walls as an effective procedure for improving the speech of postoperative cleft palate persons whose palates were mobile but not capable of satisfactory velopharyngeal closure. It is not the procedure of choice when the palate has little or no mobility.—*Burt S. Abramson.*

■ Oxygen: The Antidote for Systemic Toxic Reactions. D. C. Moore, M.D., and L. D. Bridenbaugh, M.D. J.A.M.A. 174:842 Oct. 1960.

Five hundred thirty-three systemic reactions occurred subsequent to 36,113 regional block procedures. This study indicates that such reactions result from stimulation of the brain cells by the local anesthetic drug with subsequent hypoxia of the brain cells, or direct depression of the myocardium from the local anesthetic agent which results in slow circulation and hypoxia, and that if the oxygen requirements of the brain cells are met and the heart action supported, the reaction will subside as the local anesthetic drug is detoxified. The review showed that: (1) barbiturates given preoperatively do not prevent systemic toxic reactions but only mask the early warning signs of such a reaction; (2) the first step in the rational therapy of a systemic toxic reaction from a local anesthetic is the administration of oxygen, not a barbiturate; (3) effective oxygen therapy, administered by bag and mask when the first warning signs of a systemic toxic reaction appear, will often prevent such a reaction progressing to the stage of convulsions or cardiovascular and respiratory collapse, or both; (4) anticonvulsive drug therapy is indicated only when convulsions prevent oxygenation; (5) if severe, sustained convulsions should occur, succinylcholine chloride, not a barbiturate, is the drug of choice to stop the convulsion and allow adequate oxygenation of the patient; and (6) barbiturates given intravenously when convulsions, cardiovascular collapse, or respiratory collapse occur may do harm rather than good and may actually hasten the death of a patient. —*Myron Kaufman.*

■ Results of Treatment of Squamous Cell Carcinoma of the Upper Jaw and Antrum. J. D. Erich, M.D., and L. V. Kragh, M.D. Am. J. Surg. 100:401 Sept. 1960.

In the past there has been considerable controversy regarding the merits of various methods of treatment of carcinoma of the maxillary jaw and antrum. This controversy centers not only around the use of electrosurgery or open surgical removal of the neoplasm but also around the use of radiation therapy.

It was the purpose of this study to determine the results of treatment of all patients with squamous cell carcinoma of the upper jaw and antrum treated at the Mayo Clinic from 1945 to 1954 inclusive, and, if possible, to determine the most effective form of treatment. A study was undertaken of 174 patients with squamous cell carcinoma of the upper jaw and antrum who were treated at the Mayo Clinic. A five-year survival rate of 39.4 per cent was obtained for the traced patients.

Although more patients survived who were treated by electrocoagulation alone, these pa-

tients had less extensive tumors than tumors of lower histologic grade. The favorable survival rate obtained in the more extensive, higher-grade lesions, treated by a program of electrocoagulation or surgical removal combined with radiation therapy, led to the conclusion that this probably represents the best treatment for the majority of patients having squamous cell carcinoma of the upper jaw and antrum.

The method of immediate use of radiation to the postoperative cavity as described by Paletta and Weir has not been used at the Mayo Clinic.

Because of the low incidence of cervical metastasis among the patients on their admission, and because of the difficulties in controlling the primary lesion, block dissection of the cervical lymphatic should not be performed in the absence of clinical evidence of involvement. A clinically involved node that can be readily incorporated in the field treated by radiation should be included. However, block dissection may be required at a later date if cervical metastasis is not controlled. Cervical metastatic lesions outside the field of radiation treatment should be removed by block dissection of the neck.—*Myron Kaufman.*

■ TREATMENT OF HEAD AND NECK CANCER. W. S. MacComb, M.D. Am. J. Roentg. 84:589 Oct. 1960.

Tables have been compiled to show the distribution of various anatomic cancers of the head and neck region treated during the past eight years at the M. D. Anderson Hospital by combined use of radiation therapy and surgical procedures. Planned and unplanned courses of therapy have not been tabulated separately. The number and survival rate of patients with cancer of the oral cavity, oropharynx, and larynx, treated by resection plus radiation therapy, and by radiation plus surgical procedures, are tabulated. The total number of patients treated by combined therapy, regardless of whether they have received treatment previous to admission to the M. D. Anderson Hospital, is also tabulated.

Radiation therapy is the treatment of choice for most intraoral squamous cell cancers. Primary cancer of the tongue responds particularly well to interstitial radium therapy in the form of volume implantation with needles of low intensity. Recurrences or complications of necrosis are rare, but, when they do occur, they are managed by surgical resection. External irradiation alone, or combined with interstitial therapy similar to that used for the tongue, is the treatment of choice for patients with lesions of the buccal mucosa. For the floor of the mouth, volume implants alone are preferred.

The preferred treatment for patients with cancer of the skin and lip is surgical excision. For cancer of the lip, a v-excision with immediate closure or repair by Estland or Bernard triangles is effective with very satisfactory results. The frozen section examination by the pathologist of the borders and base of the specimen at the time of excision is essential.

Only early lesions of the oral cavity (tongue, floor of the mouth, or buccal mucosa) are selected for surgical excision. Hard palate and upper gum lesions are entirely a surgical problem, the extent of the resection depending on the amount of involvement. Repair of resulting surgical defects of the upper jaw is accomplished by means of a dental prosthesis.

In the treatment of head and neck cancer, the use of both irradiation and surgical treatment is often necessary in order to control the disease. Combined therapy may be planned because of the site or extent of the tumor when the patient is first examined. It may also be unplanned. In cases where there is recurrence of the tumor after the use of one modality, the other is utilized in the treatment of the recurrence.

Patients who have cervical lymph node metastasis from intraoral cancer are best treated by radical neck dissection after completion of radiation therapy to the primary lesion. Approximately four weeks should elapse before the neck dissection is carried out. Preoperative irradiation of palpable regional metastasis, most often in the subdigastric region, is frequently used. A tumor dose of 4,000 to 4,500 r is administered through a small field to the area of the metastasis in the cervical lymph nodes over

a period of five to seven days while the primary lesion is being irradiated. Such irradiation restrains the growth of the neck metastasis until the radical neck dissection can be performed four to six weeks after completion of treatment to the primary tumor.

For the recurrent cancer of the intraoral cavity, managed originally by radiation therapy, surgical procedures are used. Further irradiation would, of course, be hazardous, the likelihood of necrosis being great. For the same reason second intraoral primary lesions are treated by excision if the first lesion was irradiated. The extent of the surgical procedure depends on the site of the tumor and the amount of involvement. The author concludes his article with the plea that there be closer liaison between the specialties of surgery and radiation therapy. Institutions giving postgraduate training in each specialty should make a provision for trainees to spend at least six months on the other service in order to familiarize themselves with the end results obtained by the other modality. In order to accomplish fuller cooperation between services, the patient should be seen and followed by each. By recognizing and accepting the limitations and advantages of each modality, the best may be achieved by both.—*Myron Kaufman.*

■ Roentgenographic Features of a New Congenital Dysplasia. E. Schwarz, M.D., and A. Fish, M.D. Am. J. Roentg. 84:511 Sept. 1960.

The roentgenographic features of a newly described syndrome are reported following the original papers of Papillon-Léage and Psaume, who studied eight cases. Five additional patients with typical features of this syndrome were studied from the roentgenographic standpoint. All were females who exhibited multiple congenital anomalies of the oral region associated with cleft palate, typical facial deformities, and anomalies of the hands and feet. The dominant feature of this syndrome is the presence of multiple congenital anomalies of the oral cavity. The presence of vestibular bands and abnormalities of the tongue was a constant finding. The cleft palate tends to be midline, irregular and incomplete; and was found in all of the patients studied. The oral anomalies occur in sites corresponding to zones of embryonal union.

The dental dysplasia is constant but by no means a typical finding. Besides the tendency for malplacement of the teeth, a higher-than-average susceptibility to caries exists. Supernumerary teeth may occur, and dentition is generally poor. An ectodermal disturbance could possibly explain these findings as well as the hypoplastic changes in the mandible occurring in these cases. The roentgen findings further exhibit a basilar kyphosis and a backward and downward movement of the cranial fossae. Also, in these cases the lower face height is increased, the mandible is hypoplastic, and mental retardation is found frequently.—*Myron Kaufman.*

■ Carcinoma of the Palate. E. P. Shirokov, M.D. Am. J. Surg. 100:530 Oct. 1960.

Cancer of the palate is not commonly seen in North America, and epidermoid carcinoma of the hard palate is stated to be very rare in current textbooks on cancer. It is the purpose of this paper to: (1) report the strikingly different features of this disease as seen in Panama; (2) cite the clinical association of chronic irritation and tobacco with epidermoid carcinoma of the palate, and (3) make a preliminary report on its treatment in this area since 1954. It is felt that this unusually high incidence of epidermoid carcinoma of the palate in Panama is associated with reverse smoking (lit end within the mouth). During the year 1954, 28,814 patients were admitted to Santo Thomas Hospital. Of these, 593 had cancer. Fifty-three, or 9 per cent of the patients with cancer, had an oral cancer. Twenty-two, or over 40 per cent of the oral cancers, were primarily carcinomas of the palate. The method of therapy in Panama City has been, and is, radiation. However, radiation therapy of these lesions has produced no "five-year cures and has not given palliation." Since 1954, surgical extirpation has been the method of choice for palatal cancer

at Gorgas Hospital, Canal Zone. Preliminary results of the surgical management of these lesions are encouraging. An outline of the surgical management is presented, the only difficult part being reconstruction of the palatine defect. This can be accomplished by the use of an obturator, free skin graft, shifting of the uninvolved palatine mucosa, using the intact tongue, or fashioning the lateral third of the tongue with its intact blood supply as a pedicle graft, and constructing mucosal pedicle grafts from the buccal mucosa or the mucosa of the posterior pharyngeal wall, or both.

Since the cervical nodes are so frequently involved, neck dissection is also performed when the tumor is laterally placed or if cervical nodes are enlarged. Ligation of the external carotid artery is performed to decrease the amount of intraoral bleeding at the time of surgery and to decrease the chances of serious bleeding if the tumor recurs.—*Myron Kaufman.*

■ "Burning Lips" Associated with Esophageal Reflux. Maurice Garretts, M.B., Lancet No. 7165: 1376 Dec. 24, 1960.

Three cases in which the esophageal reflux was shown roentgenographically are reported. These patients complained of burning sensations of the buccal mucosa. They all were shown to produce esophageal reflux. Recurrent ulcerations of the buccal mucosa, with painful erosions, might probably be reviewed in the light of this experience. It may be that these lesions of the mouth are due to the action of gastric secretions on the buccal mucosa. The patients complained of burning sensations of the tongue, lips, and buccal mucosa, and of an unpleasant sensation in the mouth. Two of them had patches of mucosal erosion, resembling aphthous ulceration. When supine, stomach contents were shown roentgenographically to be regurgitated. One patient had a sliding hiatus hernia, but no such abnormality was found in the others.

Esophageal reflux is suggested as a possible cause of some so-called "dyspeptic ulcers" of the mouth.—*Burt S. Abramson.*

■ Plastic Material as Bone Substitute in the Mandible: Experimental Observations. Vincent R. Pennisi, William R. Shadish, and Robert S. Cox, Jr. Plast. & Reconstr. Surg. 26:638 Dec. 1960.

The object of this study was to employ a plastic material as a substitute for autogenous bone in the segmental resection of the dog mandible. Struthers has demonstrated that polyvinyl sponge is tolerated by skeletal tissue and new bone will grow into the sponge to bridge a bony gap. This observation suggested that polyvinyl sponge could be used in a nonunion fracture of the mandible as a substitute for autogenous bone. This would minimize morbidity, shorten the period of convalescence, hasten ambulation, and, in the military it would expedite return to active duty. Technical problems arose in dealing with reconstructive surgery in the dog mandible. Interdental fixation was not feasible. Internal fixation was employed by an acrylic resin bar. The acrylic bar fixed the created mandibular defect, and the polyvinyl sponge, wrapped about the acrylic bar, served as the framework for new bony growth to unite the severed mandibular bone fragments.

Twelve dogs were used in this experiment. Teeth were extracted from one side. After extraction each dog received penicillin and streptomycin for five days. A minimum of one month was permitted for complete healing. When healing was complete the mandible was exposed from an extraoral incision and a 2 cm. length excised. Acrylic bar and 28 gauge stainless steel wire were used for fixation of fragments. A segment of polyvinyl sponge was placed around the acrylic bar completely filling the defect. Postoperatively, a soft gruel meal was given and penicillin and streptomycin administered each day for five days. One dog died of unrelated circumstances shortly after surgery and another had to be sacrificed because of psychotic tendencies. In two animals the acrylic bar alone was used without the sponge. The animals were observed for four weeks to seven months. The two dogs with acrylic bar fixation alone were healed at time of sacrifice, 11 weeks after the implant. The mandibular defect in five animals was repaired with acrylic

bar fixation and polyvinyl sponge with successful union in two of these dogs. The sponge was invaded with new bone. The three unsuccessful takes resulted in an extrusion of the sponge through the mouth. In three dogs, acrylic bar fixation was used and polyether sponge was substituted for the polyvinyl sponge. One of the subjects progressed to complete healing and clinical union. There was invasion of bone spicules into the sponge with a solid fibrous union around the defect. In the two dogs in whom the operation was unsuccessful, the polyether sponge extruded through the ulceration at the operative site in the mouth.—*Don Rae.*

■ TREATMENT OF FRACTURES OF THE MANDIBULAR CONDYLOID PROCESS IN CHILDREN. A.P. Panagopoulos, D.D.S., M.D., and Mario D. Mansueto, M.D. Am. J. Surg. 100:835 Dec. 1960.

Maxillofacial fractures in children present early as well as late problems.

Of the various maxillofacial fractures, the most important is fracture of the mandibular condyloid process. Results of undiagnosed, mistreated, or neglected fractures include asymmetry of face, micrognathism of the mandible, ankylosis of the temporomandibular joint, open bite, malocclusion, and often psychic problems.

Fractures of this type easily escape early diagnosis. There are three schools of thought regarding the most effective treatment of this fracture.

One is that nothing should be done during this early period of age. The second is open reduction and fixation of the fractured condyloid process by wire, intraosseous sutures, or small metallic flax and screw appliances. The third is early immobilization of the mandible after fracture.

A combination of technics is used; namely, circumferential and perialveolar wiring. The wire goes around the alveolar process of the maxilla. When these applicators are applied together, they stabilize the arch bars. Then interelastic traction can be applied to maintain immobilization.

In dealing with the persons whose teeth are inadequate as a means of retention, it must be realized that immobilization of the mandible to the maxilla is a serious technical problem.

If some of the teeth are in good condition and can be utilized, they certainly should be wired and used as an auxiliary means for stability of the arch bars.

It is desirable to have dental background for application of dental appliances. Recently there was an undesirable trend toward ignoring the importance of the function of the dental structures themselves.

This combination of methods serves to immobilize the mandible to the maxilla, thereby helping to splint the fracture during the natural processes of repair. During an average of three weeks of immobilization, which is sufficient for union, the young patient should be observed carefully in order to avoid postanesthesia complications and later nutritional and other disturbances.

Finally, the surgeon who attempts to manage fractures in children must approach the fearful or perhaps hysterical child with sympathy and understanding.—*Burt S. Abramson.*

■ ANESTHESIA FOR CLEFT LIP AND CLEFT PALATE SURGERY. John E. Mahaffey, M.D.; J. Henry Sprouse, M.D.; S. M. Witherspoon, M.D., and Claudia Oxner, M.D. Plast. & Reconstr. Surg. 26:596 Dec. 1960.

Many anesthetic technics and agents have been described for the management of cleft palates and cleft lips. Ninety-one cases of cleft palate and cleft lip repairs were reviewed. One of the major problems has been a high incidence of nutritional anemia. This problem has been significantly reduced by administration of one of the iron preparations several months before the scheduled procedure. Coryza is noted to be a common occurrence in the patient with a cleft. This should be differentiated from an upper respiratory infection. Tracheal intubation is the best assurance of a patent airway and provides a route for tracheal suction. Light and smooth anesthesia can be accomplished without the risk of hypoxia and hypercardia. If insufflation

technic is used, the surgeon must assume a great deal of responsibility for maintaining a clear airway. Local anesthesia seems to be a feasible method of maintaining a patent airway provided the patient is not sedated to such an extent that protective reflexes are obtunded. Advocates of moderate hypothermia have been impressed with the decreased blood loss. Aspirations can be assisted or controlled more adeptly with a non-rebreathing valve on infant circle filter. Forty-five per cent of the patients received nitrous oxide-thiopental sodium and 38 per cent of the patients received nitrous oxide-ether and remained in the recovery room for a period exceeding two hours. Sixteen per cent of the patients who received nitrous oxide-halothane remained in the recovery room for a period exceeding two hours. The predominant hazard noted in the anesthetic management described is the occurrence of a postoperative tracheitis. All patients responded to conservative management. Cephalometric laminagraphy, a body sectioning roentgen-ray technic, was used to obtain registrations on 125 cleft subjects, of three years of age and under, with unoperated cleft palates. Roentgenographic registrations were also obtained on a controlled sample of 15 noncleft palate subjects of comparable age. The cleft subjects were divided into four types depending on the cleft aberration present and also were divided into three age levels. Deficiency of hard palate tissue seems to be confirmed by the present study which has shown it in all palates. This was not true for the patients with clefts in whom only the lip and alveolar process were involved. Observations strongly indicate that deficiency of hard palate tissue is most likely to be found in the bilateral and posterior cleft types. The greatest displacement as well as the greatest deficiency was found in the bilateral clefts. Clinical observations are often made that certain bilateral and posterior clefts are difficult to treat. The explanation might well be found on consideration of greater likelihood of tissue deficiency in these patients. There was a strong indication of lateral displacement of the maxillary bones, in the oronasal region, in the subject with bilateral and posterior clefts of the palate. The unilateral cleft palate subject showed the least evidence of displacement as well as deficiency.—*Don Rae.*

■ SURVIVAL OF SKIN HOMOGRAPHS EXCHANGED BETWEEN IDENTICAL TRIPLETS WITH DIFFERENT TYPES OF CLEFT LIP-PALATE DEFORMITIES. Lyndon A. Peer, M.D.; Iqbal S. Walia, M.D., and Ruth J. Pullen, R.N. Plast. & Reconstr. Surg. 26:622 Dec. 1960.

Three similar appearing 19 year old boys were seen for adjustments of their repaired cleft lip deformities. The severity of the congenital defects affecting the three brothers were all different. Robert had a cleft lip deformity on the left side with a normal palate; Andrew had a cleft lip deformity on the left side with a complete left palate defect extending to the alveolus, and Joseph had a bilateral cleft lip deformity associated with a complete cleft in the palate. At the time of the lip repairs, full-thickness skin grafts from the posterior surfaces of the auricles were exchanged between the triplets so that each boy received a skin graft from his two brothers. These skin grafts behaved like autografts and have persisted for 212 days. All of them were considered as surviving homografts. The blood types were all identical. Fingerprints were similar but not exactly the same, as is always true with identical twins. The different degrees in the severity of the deformities afflicting each triplet are a matter for speculation. Some intrauterine environmental factors in varying degrees may have affected the development of the triplets. There may have been a variation in the even distribution of chrometin material in genes during the process of successive cell divisions. The equal segments might have a slightly different chemical composition. The complete tolerance to full-thickness skin homografts exchanged between the triplets in the matching sub-blood groupings is positive evidence that the triplets are identical. Apparently the origin of two or three individuals from a single fertilized ovum does not insure exact replicas of the facial anatomy of identical twins and triplets as they grow older.—*Don Rae.*

■ A Handbook of Differential Oral Diagnosis. By Major M. Ash, Jr., 234 pages. Appendix and index. $6.50. St. Louis, C. V. Mosby Co., 1961.

A Handbook of Differential Oral Diagnosis is a text which is aptly titled since it is exactly that—a handbook. It has a tendency to be redundant; as a result, cross references in the body of the text and in the index are encountered frequently. Descriptions of the various presented oral diseases are brief. The table of contents is an alphabetically arranged outline of the subjects covered, beginning with "Abrasion, attrition and erosion," and ending with "Vitamin deficiencies."

An appendix is utilized to present tables of tooth development, laboratory tests and values, dietary allowances and tests for hemorrhagic disorders. There is no bibliography.

As a quick reference for aid in differential diagnosis of various oral diseases, *A Handbook of Differential Oral Diagnosis* may have a place on your library shelf, but it must be kept in mind that it was not conceived as a text to supplant the more standard volumes dealing with oral disease.—*Paul H. Mathews.*

■ Tumors of the Odontogenic Apparatus and Jaws. By Joseph L. Bernier. Photographs. $1.00. Washington 25, D. C., Armed Forces Institute of Pathology, 1960.

This fascicle on the tumors of the odontogenic apparatus and jaws is a long-awaited publication. It serves as a very valuable guide to those who have interest in the histologic foundation upon which the entire practice of dentistry and the health of the oral cavity rests. This publication contains roentgenographic and clinical photographs as well as many excellently reproduced microscopic photographs in different magnifications. These are all in black and white. The text is enhanced by having this in monochrome as actual cell morphology can be studied undisturbed by any color. There are, however, two plates of color photographs which are excellently reproduced. This publication is an excellent presentation of the tumors of the odontogenic apparatus. It is to be highly recommended to all who engage in the practice of oral surgery and to all who have a deep interest in oral pathology.—*Marvin Revzin.*

■ Outline of Pathology. By John H. Manhold, Jr., D.M.D., M.A., and Theodore E. Bolden, D.D.S., M.S., Ph.D. 340 pages. Philadelphia, W. B. Saunders Co., 1960.

This outline of pathology is intended to fill the gap between an abridged text and a standard text on general pathology. It is written by the professor and assistant professor of oral diagnosis and pathology, College of Dentistry, Seton Hall, College of Medicine and Dentistry.

Part I is an outline of introductory general pathology covering the etiologic factors in disease, the tissue responses to disease, circulatory disturbances not caused by specific heart and vascular disease, inflammation and repair, general aspects of infection, as well as the various infectious diseases. Part I concludes with deficiency diseases and disturbances of growth including a well outlined chapter on neoplasms.

Part II outlines pathology of the various systems of the body, concluding with a brief outline of disorders and diseases of the specialized sensory organs including the eye, ear, nose, throat and skin.

The book is well indexed and, as intended, will serve the student as a basic outline for study only. There is no bibliography as nothing new is presented nor any controversial issues raised. The graduate will enjoy referring to it as a condensed review which will stimulate the reader to refer to a standard text of pathology for a more detailed description of a particular disease. No mention is made of the treatment of any disease. It is a small book and serves its intended purpose as a reference for an outline of general pathology.—*Wilbur J. Dickman.*

■ LES PARODONTOLYSES; PATHOLOGIE, CLINIQUE, THERAPEUTIQUE. By A. J. Held and A. Chaput. 360 pages with 564 figures. Paris, France, Ed. Julien Prelat, 1959.

This comprehensive new textbook on destructive periodontal diseases has been written by two well-known and distinguished European authors. Dr. Held's first textbook of periodontics was published in 1939. It immediately became an authoritative and generally recognized source of information in the field of periodontics, although it was unmistakably colored by the identity and philosophy of the author. That his philosophy has survived the development in periodontal research during the intervening two decades further confirms the world-wide esteem of the author. Many of the theoretical assumptions of 1939 are carried over as established scientific principles into the current textbook.

The dynamic interplay between the various factors in the etiology of periodontal disease is the main theme of the book. The etiology is considered according to "Weski's triad," with constitution and predisposition as one main group, the systemic disturbances as the second main group, and finally, the local causes as the third main group.

Extensive coverage has been devoted to dysfunctional occlusal factors and their elimination through occlusal adjustment and splinting procedures. The functional treatment in most instances is based on well-established principles with the exception of some controversial bite-raising appliances. Comparatively limited space is devoted to periodontal surgery. A number of known and lesser well-known surgical technics are listed and discussed briefly. However, one feels that the authors do not possess the same degree of interest in and familiarity with these surgical technics as with the other phases of periodontal therapy.

New for American readers is the concept that "reticulosis" constitutes a major pathological entity in the classification of periodontal disease. This is in addition to the classically listed three major pathologic processes (degeneration, inflammation, and neoplasia).

The book is printed on excellent paper and most of the illustrations are of unusually high quality. It satisfies the demand for another textbook of periodontics in French. Furthermore, it serves a very important purpose in supplementing the American textbooks with the Central and South European research findings and concepts of periodontics. The authors should be congratulated on a beautiful book that will stimulate the reader and increase his knowledge.—*Sigurd Ramfjord.*

■ NEW AND NONOFFICIAL DRUGS. Evaluated by the Council on Drugs of the American Medical Association. Philadelphia, J. B. Lippincott Co., 1961.

Each year the Council on Drugs of the American Medical Association publishes a volume describing drugs which have been evaluated on the basis of available clinical and laboratory reports. These drugs must be generally available in the United States and not have been included in the *United States Pharmacopeia, National Formulary* or *New and Nonofficial Drugs* for a prior cumulative period of 20 years.

Each preparation is described in the form of a monograph and includes the generic name, proprietary names, chemical or biological identity, pertinent properties, actions and uses, limitations, side effects, toxicity, contraindications, dosage, route of administration and available sizes or strengths.

Several drugs such as Carbomycin and erythromycin propionate have been omitted from the present edition because they are no longer commercially available in the United States.

Several drugs of interest to oral surgeons such as methohexital, ethoheptazine and methocarbamol have been added since the previous edition of *New and Nonofficial Drugs* was published.

Since the field of pharmacology is becoming more and more complex year by year it behooves every practitioner to keep himself well informed as to the actions and uses of the preparations he employs. No better supplement can be found to a standard pharmacology text than *New and Nonofficial Drugs.—David L. Ford.*

■ FORTSCHRITTE DER KIEFER- UND GESICHTS-CHIRURGIE: EIN JAHRBUCH, BAND V (PROGRESS IN MAXILLOFACIAL SURGERY: A YEARBOOK, VOLUME V). Edited by Karl Schuchardt. 369 pages with 182 illustrations. DM. 118. Stuttgart, Georg Thieme, 1959.

This volume contains a selection of lectures delivered at the eighth conference of the German Society of Maxillofacial Surgery which was held in Hamburg in 1958.

The conference's main topics were as follows: (1) Analgesia and Anesthesia During Surgical Interventions in the Maxillofacial Region; (2) Surgical and Plastic Repair of Cleft Lip, Cleft Jaw and Cleft Palate, and (3) New Methods in Treatment of Fractures in the Maxillofacial Region. Psychologists, physiologists, pharmacologists, anesthesiologists, oral surgeons and general practitioners of dentistry from Austria, Hungary, The Netherlands, Switzerland and Germany participated in the meeting.

About 60 lecturers dealt with these topics, performing an outstanding service for present-day dentistry, especially oral surgery, by reporting the different anesthetic and surgical methods and technics used in Europe.

This book, excellently printed, illustrated and bound, can be recommended as a part of required reading in courses on dental anesthesia and oral surgery. It would be a valuable addition to the professional library of dental practitioners and specialists. Brief but comprehensive summaries in English, French and Spanish accompany each paper, taking care of the differences which exist between the American and the German terminology.—*Paul H. Glucksman.*

■ ORAL PATHOLOGY. By Kurt H. Thoma and Henry M. Goldman. Fifth edition. Illustrated. $27.50. St. Louis, C. V. Mosby Co., 1960.

The fifth edition of *Oral Pathology* is an excellent, all inclusive text in the field of oral pathology. For this edition, Dr. Goldman collaborated with Dr. Thoma.

The text has been revised to be better utilized as a textbook and as a reference book. The bibliography is extensive and relatively complete. The illustrations are good. New ones have been added to those from previous editions. New cases have also been added for illustration.

This volume deserves a place in the library of anyone interested in or concerned with the field of oral pathology.—*Paul H. Mathews.*

■ THE DENTIST IN ART. By J. J. Pindborg and L. Marvitz. Illustrated. Chicago, Quadrangle Books, 1960.

This is a most unusual book. It depicts the dentist and dentistry through the ages as interpreted by sculpture and drawing. From the introduction, "For centuries the activity of dentists and symptoms of tooth disease have been used as themes in works of art—in drawings and paintings, sculptures and woodcarvings. Apart from their purely esthetic value, these artistic efforts have had great significance for research in dental history and through them we gain valuable information as to the development of dentistry through the years."

The authors have divided the book into three large sections: (1) The Dentist and his Work; (2) The Patient and his Symptoms and (3) Humor and Satire. Characteristic illustrations have been selected that could be placed

in one of these categories. The great masters such as Jan Steen and Leonardo Da Vinci are represented in this book. Of particular interest to the dentists is the careful way Da Vinci observed the effects of lost teeth on a man's physiognomy in the famous line drawing, "Age Confronting Youth." The contrast between the old man and the youth is startlingly revealed. Works by Pieter Breughel and Goya are also representative of the old masters. There are a number of line drawings and engravings by unknown artists who depict the barber surgeon or the village smith when they acted as dentists.

In the section on humor and satire the dentists and the patient are not too kindly handled. Throughout the ages the dentist and his profession have not been viewed too kindly by artists and we find little warmth or understanding or compassion depicted in any of the included artistic representations. Although a very necessary profession, dentistry, at least as depicted in art, fares poorly. The book, however, will appeal to dentists throughout the world. It will stimulate their imagination and provide a thought-provoking interlude in their everyday activities.—*Marvin Revzin.*

■ FUNDAMENTAL TECHNIQUES OF PLASTIC SURGERY AND THEIR SURGICAL APPLICATIONS. Ian A. McGregor. 244 pages with 150 illustrations. Index. $7. Baltimore, Williams & Wilkins Co., 1960.

The author has fulfilled his apparent objective of providing a book that will offer the reader fundamental technics of plastic surgery that may be applicable to other surgical specialties. The book makes no attempt to serve as a comprehensive text on plastic surgery. Rather, it is intended primarily for surgeons who have not received formal training in plastic surgery but seek guidance on basic plastic technics that may be utilized to enhance the surgical care of specific situations which they may encounter.

The material is presented under two broad headings. Part one, consisting of four chapters, describes basic plastic surgery technics. The first chapter, "Wound Care," offers a practical approach to, and understanding of, several factors which influence the healing of wounds. Consideration is given to proper positioning of incisions, preparation of wounds, suturing, and procedures for dealing with hypertrophic scars. The succeeding three chapters cover the principles of the Z-plasty, free skin grafts, and tissue flaps. Part two, also containing four chapters, applies the previously described fundamentals to certain surgical problems of general surgery, orthopedic surgery, hand injuries, and reconstructive procedures of the eyelids.

The text, well organized and clearly written, is adequately supported by appropriate understandable diagrams and illustrations which depict the described technics and add measurably to the book's value.

Any practitioner whose professional endeavor and interests include surgery to the superficial tissues will find sufficient worthwhile information in this book to justify its addition to his library.—*Herbert J. Bloom.*

■ LOCAL ANESTHESIA AND PAIN CONTROL IN DENTAL PRACTICE. By Leonard M. Monheim. 299 pages. Illustrated. Index. $8.75. St. Louis, C. V. Mosby Co., 1957.

This concise and compact text contains most of the information a practicing dentist should have readily available for reference and brief review of the anatomical and technical aspects of local anesthesia.

The first chapter provides an interesting discussion of the anatomy, physiology, and psychology of pain and those factors which modify the response of a patient to pain. The chapter which follows reviews the distribution of the six cranial nerves of interest to dentists with emphasis properly placed on the trigeminal nerve. Some of the accompanying diagrams lose clarity from being too detailed and comprehensive for the size of the page.

Separate chapters cover in detail the topics of major importance such as preanesthetic evaluation and medication, technics for regional anesthesia, and the prevention and treatment of anesthetic complications. Drugs for preanesthetic and postoperative medication for

both adults and children are listed in tabular form for quick reference. Information is provided on how to modify preanesthetic and anesthetic procedures for patients with cardiovascular disease, hyperthyroidism, allergy and diabetes.

The commercially available anesthetic agents and the various types of vasopressor drugs are discussed so that a rational basis is provided for a choice between the marketed products. The chapters on armamentarium and sterilization are valuable and are well presented.

The technics presented for extraoral nerve blocks are somewhat confusing as compared to those presented elsewhere in the literature. Therefore, these blocks should not be attempted by the suggested technics without further reference to the literature.

With the exception of a few shortcomings, the book is well written and illustrated. It should prove a worth-while addition to the library of the dentist in general practice.

■ INTERNAL MEDICINE IN DENTAL PRACTICE. By Leon H. Collins and Martin P. Crane. Fifth edition. Philadelphia, Lea & Febiger, 1960.

There has always been a warm spot in this reviewer's heart for the textbook, *Internal Medicine in Dental Practice*, and now with the fifth edition it is nice to find that the value of this text has improved. The first edition was published in 1938 and the fifth edition is evidence of its continued popularity. It fills a very important place in bridging the knowledge between dentistry and medicine. The authors have always felt that the "dentist always occupies a position on the health team of ever increasing usefulness to his patients as well as to his colleagues and allied fields of medical practice, himself, and his physician colleagues." For this reason they have presented a very thorough description of medicine useful to the dentist while he gains knowledge that will help him work more efficiently and with more complete regard for his patients.

The fifth edition has been considerably revised but the presentation is still a "simple and straightforward text that will afford the reader a speaking knowledge of contemporary internal medicine." This edition has tried to keep up with the progress in medicine that has been made since the previous edition was published, and by and large has succeeded. However, as with many texts, current information is not always possible and all one can hope for is that the most current basic fundamentals are presented with as much accuracy as possible. For timely information about diagnosis or treatment one must depend on the periodical professional literature.

As with many good texts, occasionally there are things to which one must take exception. In the section, "Advice concerning dental and gingival focal infections," the authors try to set down hard and fast rules as to how many teeth may be removed at any one sitting in the presence of systemic disease. This becomes a very difficult thing to do and substitutes rule for reason. This, of course, is not professional. For example, it is stated that "after the first extraction 2 or 3 infected teeth may be removed at one sitting but under no circumstances should more than 4 infected teeth be removed at any one time." This reviewer assumes that they are referring to a given number of teeth in the presence of systemic illness although this is not specifically so indicated. Even so, to be as dogmatic as to indicate the exact number of teeth which may or may not be removed at any one time I think extends beyond the purview of the author's professional judgment.

The book nonetheless is a valuable text for the dentist who is interested in his patient as an entire individual. It is still one of this reviewer's favorite texts and will continue to be well recommended.—*Marvin Revzin.*

Announcements

■ Conference on Graduate Education in Oral Surgery Set for November

The American Society of Oral Surgeons will conduct its fourth conference on Graduate Education in Oral Surgery, November 27, at the headquarters of the American Hospital Association, Chicago. In conjunction with this meeting the advanced institute on hospital dental service conducted by the Council on Hospital Dental Service of the American Dental Association and the American Hospital Association will be held November 28 to 30, also at the hospital association's headquarters.

■ Final Survey of Dentistry Report Now Available

The final report of the Commission on the Survey of Dentistry in the United States is now available. The previously issued *Summary Report* was based on the detailed findings and recommendations published for the first time in this 600-page volume. Copies may be purchased, at $10 each, from the American Council on Education, 1785 Massachusetts Ave., N.W., Washington 6, D.C.

■ Highland-Alameda Hospital Has Three-Year Oral Surgery Residency

The Highland-Alameda County Hospital, Oakland, Calif., is offering a three-year residency program in oral surgery. An educational fund of $300 is available for second-year residents to attend any scientific, educational meeting of his choice, with the approval of the chief of service. Stipends allotted to house staff are: Intern (12 months), $175 per month; first year resident (12 months), $220 per month, and second year resident (12 months), $255 per month. Applications may be secured by writing G. Otis Whitecotton, M.D., medical director, Alameda County Medical Institutions, 2701 14th Ave., Oakland 6, Calif.

■ American Society of Dentistry for Children to Hold Annual Meeting

The thirty-fourth annual meeting of the American Society of Dentistry for Children will be held October 13-15, Bellevue-Stratford Hotel, Philadelphia. There will be a closed circuit television program on cleft palate treatment and a panel discussion on growth patterns in children in addition to scientific sessions, registered clinics, table clinics and a social program. Further information and advance registration may be obtained from Manuel M. Album, A.S.D.C. convention director, Medical Arts Building, York Rd. and Hillside Ave., Jenkintown, Pa.

■ Research and Teaching Traineeships at University of Pennsylvania

Research and teaching traineeships in the basic sciences, in periodontology and in the comprehensive treatment and rehabilitation of the cleft palate patient are available at the School of Dentistry, University of Pennsylvania. All traineeships are supported by the U.S. Public Health Service. Annual stipends vary from $4,500 and up depending on the qualifications and needs of the successful candidates.

Inquiries for the basic science and cleft palate traineeships should be sent to the chairman, Committee on Traineeships and Fellowships, University of Pennsylvania, School of Dentistry, 4001 Spruce St., Philadelphia 4. Inquiries for traineeships in periodontology should be sent to the dean, Graduate School of Medicine, 237 Medical Laboratories, University of Pennsylvania, Philadelphia 4.

■ Oral Surgery Residency Available at Mount Sinai Hospital

A two-year residency in oral surgery is available at The Mount Sinai Hospital of New York. It includes both didactic and clinical training. The residency is presented under the auspices of the hospital in conjunction with the School of Dental and Oral Surgery of Columbia University. Information and application forms may be obtained from Alvin Nathan, director, Department of Dental and Oral Surgery, Fifth Ave. and 100 St., New York 29.

■ St. Louis Alumni Present Commendation Award to Arthur E. Smith

Special commendation has been accorded Arthur E. Smith, M.D., D.D.S., St. Vincent's Hospital, Los Angeles, by the alumni of St. Louis University in the form of an outstanding award. The award read, "In recognition of distinguished achievement in the dental profession. He is hereby entitled to the gratitude, respect, and esteem due to one who has given signal evidence of the University's influence in promoting God's greater glory and the welfare, temporal and eternal, of men."

■ Oral Pathology Program Offered at University of Oregon

A graduate program in oral pathology is being offered at the University of Oregon Dental School. It is a three-year program, the first year of which consists of resident-type training in general pathology at the University of Oregon Medical School. The following two years are taken under the direction of Norman H. Rickles and Robert J. Bruckner at the Dental School. A special research activity leading to a thesis completes the requirements for the Master of Science degree in oral pathology. Financial support is available through the Teacher-Training Program of the U.S. Public Health Service, and a stipend will vary from $4,000 to $5,000 per year depending on individual circumstances. Inquiries should be addressed to Ellis B. Jump, chairman, Graduate Committee, University of Oregon Dental School, 611 S.W. Campus Drive, Portland 1.

■ Maxillofacial Prosthetics Academy to Hold Philadelphia Meeting

The American Academy of Maxillofacial Prosthetics will hold its tenth annual meeting at the Benjamin Franklin Hotel, Philadelphia, October 11-13. The general business meeting and the professional program will begin Thursday morning, the 12th. Further information may be obtained from Mervin C. Cleaver, executive secretary, 2330 Linwood Ave., Apt. 3H, Coytesville-Fort Lee, N.J.

■ Periodontics Course at Albert Einstein College of Medicine

The Department of Dentistry of the Albert Einstein College of Medicine, Yeshiva University, is offering a postgraduate course in periodontics. The course is under the direction of Irving Yudkoff, Marvin N. Okun and associates, and will be held October 30 to November 3. Tuition is $175. Further information and application blanks may be obtained from the director, Postgraduate Dental Program, Albert Einstein College of Medicine, Yeshiva University, Eastchester Rd. and Morris Park Ave., Bronx 61, N.Y.

■ Mount Sinai Hospital Offers Two Courses for the General Practitioner

The Mount Sinai Hospital of New York will offer two postgraduate courses for the general practitioner beginning in the autumn of 1961. They are: Analgesia and pain control—lectures will include pharmacology, emergency treatment, management of the difficult patient and prescription writing. Minor oral surgery for the general practitioner—local anesthesia, impactions, apicoectomies, biopsy technics, mouth preparation for prosthetic appliances and other subjects will be included. Further information, catalogs and application forms may be obtained from A. Norman Cranin, chairman, Education Committee, Department of Dental and Oral Surgery, Mount Sinai Hospital, Fifth Ave. and 100 St., New York 29.

■ Polio-Stricken Dentist Operates Magazine Service

Louis W. Soldan, a polio-stricken dentist, operates a professional subscription service for magazines and periodicals from his wheel chair. He offers a reminder service for renewals, gift service on all publications and service on all special rate offers. Magazines for the office and home may be obtained through his service. His address is 135 Edgewater Drive, Framingham, Mass.

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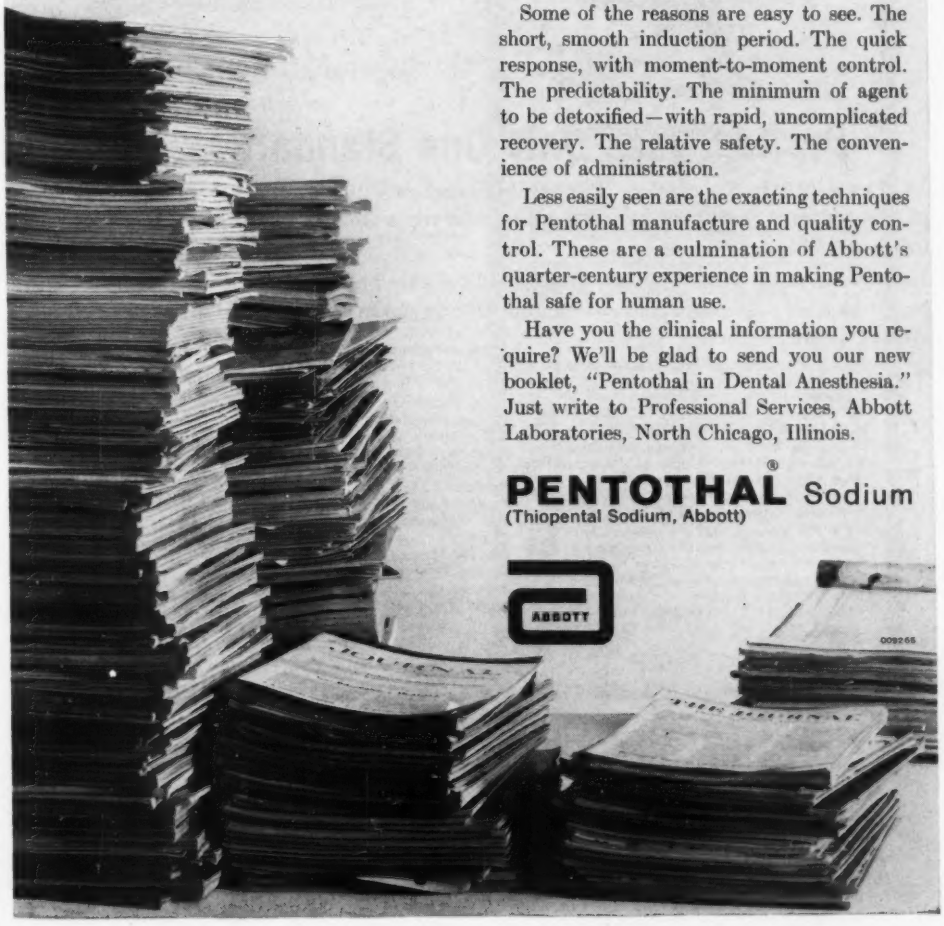

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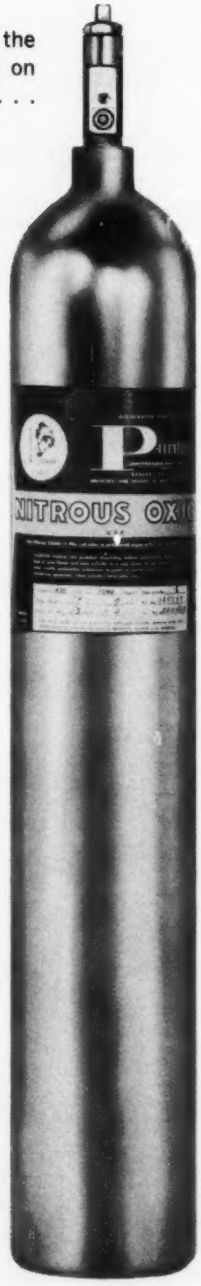

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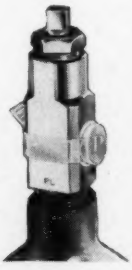

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